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China's Vocational and Technical Training

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China is reforming its vocational and technical education and training to meet the skilled labor requirements of a changing economy.

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To attain the number of skilled and semiskilled workers needed for its projected development, China must give higher priority to vocational and technical training and education.

Enterprises are being asked to implement a policy of "training before employment." Rather than hire and train unskilled workers assigned to them by government labor bureaus (the previous system), managers are now expected to require appropriate training credentials of new employees.

Until now, vocational and technical education has regularly been underfunded by government and provided by enterprises. This tradition of enterprise-based training reflects a link between training and industry that many industrial nations are only now trying to establish. But this training has generally been inefficient, overspecialized, and far too time-consuming for what it accomplished.

Authorities in Beijing are encouraging provincial, county, and municipal authorities to attain 50% enrollment in secondary schools of general education and 50% (greatly increased) enrollment in vocational and technical schools — to support the goal of expanding the service sector and self-employment. The overall pattern will be to strengthen the free-standing secondary technical and vocational schools; to introduce vocational programs in the general education high schools; and to develop enterprise-based skilled workers schools.

The core system of lifetime employment is to be replaced by a system of contract labor, permitting managers to hire workers for fixed periods and allowing workers limited latitude for negotiating compensation and terms of employment in return for surrendering tenure. (The old system of low, nationally determined wage scales remains in place; whether and how a system of bonuses will be used to improve worker-manager incentives remains to be seen.)

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I. INTRODUCTION

China has embarked on a series of reforms designed to improve the efficiency of productive enterprises through the introduction of elements of a competitive market economy. Vocational and technical education and training (VTE) is to be expanded and improved to meet the skilled labor requirements of a changing economy.

The efficiency of the VTE system in meeting changing requirements for skilled labor depends in large part on effective planning and linkages with employment. This study analyzes VTE planning and labor market linkages in the context of the economic reforms, and in comparison with the vocational education and training systems of other countries.*

The discussion is constrained by several limi First, the focus of the larger study of which this forms a part has been on training and education for employment in industry and the tertiary sector only, plus some training for self-employment. Hence training for agriculture and rural employment has not been addressed. As 61 percent of China's population lives in the rural areas of the country, the special focus of the larger study constitutes an important limitation.

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*This analysis has been undertaken as part of a larger World Bank study of VTE in China, and is based on interviews with Chinese officials at various levels, a survey of schools in three provinces, observation of VTE institutions and enterprises in two of the three provinces, and review of relevant literature.

In 1981, the labor force in China totalled 452 million, out of a population of 990 million. Of the 452 million persons in the labor force, 70 percent (316.4 million) were engaged in agriculture; 9 percent (40.7 million) in heavy industry; 6 percent (27.1 million) in light industry; 10 percent (45.2 million) in services (which includes education, health, public administration, defense, commerce, housing and miscellaneous services); and 5 percent (22.6 million) in infrastructure (which includes electricity, construction, and transport (World Bank, 1985: 40). As of 1981, the Ministry of Education estimated the status of the total labor force with respect to training, as shown in Table 1:

Table 1: Education Level of the Chinese Labor Force, 1981

Education Level	% of total labor force
Higher	0.5
Technical Secondary	0.9
Senior Secondary	6.7
Junior Secondary	20.5
Primary	37.8
Less than primary	33.7

Source: World Bank, 1983: 137.

This report is concerned with the 0.9 percent reported on the second line, plus some undefinable fraction of the 6.7 percent on the third line, who were given vocational education in senior secondary schools. A fair estimate is that we are dealing with technical and vocational education arrangements that have involved about 2.0 to 2.5 percent of a labor force of 500 million, or between 10 and 12.5 million workers. Other workers have received some technical or vocational training on-the-job or in association with their work. It was reported to us that China has some 400,000 firms (of which 6,000 are designated as "large"), employing 70 million workers. Many of these firms, but especially the large ones, offer in-service training to their employees. No estimate can be given of the number involved in such training not leading to a formal credential.

Second, the study has been restricted to secondary level training and education.

Third, although various secondary sources pertaining to VTE in China have been consulted, data gathering in the field has been focused on only two provinces, Liaoning and Hubei, both rather well developed by Chinese standards. Liaoning, in particular, is heavily industrialized. Thus the description, analysis and conclusions below must be interpreted cautiously for China as a whole, and then only for urban training for industrial and service sector employment and self-employment.

Lastly, vocational and technical education in the two provinces studied represents the current system at or near its strongest. Thus any analyses or conclusions which rely primarily on data from these provinces should be taken as relevant to possible policy directions for the better developed areas of China in the immediate future, though they may also be broadly indicative of directions for the system as a whole over the longer term.

The Context of Economic Reform

China's economy has been the object of many rapid and far-reaching changes in direction since 1949. Current reforms have led to significant changes in both the rural and urban economies. While the government asserts that China will remain solidly within the socialist form of society, it has nevertheless mandated changes in the forms of economic control bearing many essential hallmarks of a competitive, market economy. China in 1987 thus stands poised somewhat ambiguously between its heavily controlled, orthodox-socialist past and a more loosely managed, experimental market-socialist future as it establishes a "planned commodity economy."

China's long-term plan for economic growth emphasizes increased investments in new technology and increased efficiency of enterprises. An economy historically dominated by agriculture and industry is to be diversified by expanding the commercial and service sectors to create revenue and employment as well as to support a number of reforms aimed at establishing open commodity and labor markets in at least a portion of the economy.

Current economic reforms are directed toward establishing the profitability of enterprises in a more competitive environment as the prime criterion of success. Enterprises are to be allowed to retain a larger share of profits for investment in the firm and worker incentives. At the same time, enterprises, even those owned by the State, are to be allowed to go bankrupt, if they remain unprofitable over a relatively long period. In addition, a revival of the private sector of the economy is being encouraged as an important sector in its own right, and as a valuable spur to greater efficiency in the State-and collectively-owned enterprises.

Labor Market Implications

In general, managers report that they are short of adequately skilled labor, and overwhelmed by abundant supplies of inadequately skilled labor. At the same time, pre-employment training opportunities in secondary vocational and technical schools have been severely

restricted, relative to the demand. There is exceptionally keen competition to win a training place (not infrequently ratios of 5 or more applicants for every place available are cited), and newly trained youngsters find it relatively easy to secure a job.

The reforms point to some important changes in hiring practices. In principle, the core system of lifetime employment has been abandoned for all newly hired employees, and is to be replaced by a system of contract labor, permitting managers to hire workers for fixed periods (usually a least five years), and allowing workers some latitude to negotiate compensation and conditions of employment in return for surrendering tenure. Instead of having to rely on, or simply accept, labor assigned to them, firms are encouraged to hire from the public, using examinations, a mechanism of some importance for increasing managers' selection powers. At the same time, enterprises are being asked to implement a policy of "training before employment". This is said to represent a shift away from previous practices, in which enterprises might hire an unskilled individual (often a current worker's child, or the child of someone else with "connections"), and then arrange for his/her training. Now, to become a candidate for a job, the youngster is supposed first to show an appropriate credential from education or training. Often such candidates are required to compete for employment through the enterprise's own examination and interviewing process.

A new institution, the Labor Service Company, has been established. Set up originally to register job-seeking youth, the LSCs have gone far beyond this original mandate to establish a wide range of enterprises, to provide training and employment, both for workers in their own firms and to prepare workers for employment elsewhere. Training of this sort qualifies under the "training before employment" policy.

These reforms represent significant departures from the previous system of life-time employment and job assignment by government labor bureaus. However, a number of elements of the prior system remain, both formally and in the orientation of firms. The nationally determined wage scales remain in effect. These provide meager within-scale salary differentials between levels of skills. The differences among the two major scales (for workers and managers/professionals) are also small. Combined with very slow promotion, this compressed wage structure provides few financial incentives to workers to raise their levels of productivity. The uniform wage structure further restricts the ability of enterprises to use wage differentials to attract workers from other entities, a factor which contributes to very low worker mobility.

Firms have been given much more freedom to use bonuses and benefits as incentives. Bonuses average between 10 and 18 percent of the wage bill, though they can go as high as 40 percent (King, 1984, p. 62). Thus bonuses can provide managers with a potentially important

set of incentives. At the same time, traditions of equal bonuses and the difficulty experienced by managers in linking pay to productivity in a clearly objective manner serve as constraints on aggressive incentive systems tied to productivity.

Thus, three characteristics of the Chinese labor market have contributed to the severe shortage of trained labor. Because skilled labor is relatively cheap, managers have had little incentive to economize in their use of such labor, whether produced via pre- or in-service training. Second, it has been usual for managers to assign workers to training, rather than workers volunteering. Hence, workers may lack incentives to master new skills. Third, managers were neither required to make a profit, nor permitted to retain much if they did. The material incentive to raise the productivity of labor via training, or otherwise, was consequently weak. Under such conditions, it would be strange indeed if the labor market did not show the severe imbalance that is reported between the supply of and the demand for skilled labor.

Links to Vocational and Technical Education

The current watchwords in both economic reform and in the arrangements for training are "decentralization" and "devolution of authority and responsibility". After a generation of trying to control the labor market and the provision of vocational training from Beijing, the change to decentralization is striking in both its extent and its pace. The State (i.e., the authorities in Beijing) are encouraging Provincial, county, and municipal authorities to set their own pace and sometimes their own means for attaining centrally established goals. Thus, the goal of 50 percent secondary school enrollment in vocational/technical schools and 50 percent enrollment in schools of general education will be achieved by the provinces, and by the localities within these provinces, at quite different speeds, and in markedly different ways. Some will emphasize the development of the Secondary Vocational Schools (SVS) under the direct control of the Education Bureaus; others will build more heavily on existing facilities and will extend their Secondary Technical Schools (STS).* In all cases, the mandate is to pay close attention to what the employers say they need, and act accordingly.

It is also the government's hope that the emphases on profitability and local authority and responsibility will help break down some of the compartmentalization and segmentation that have been notable features of the system of production, the labor market, and the training institutions. Chinese commentators refer to the "vertical"

* Nomenclature is a persistent problem for the foreign observor of these schools. The Chinese term for what are called Secondary Technical Schools translates as "Secondary Specialized Schools". These include teacher training schools.

arrangement of their society, by which is meant that economic and educational institutions try to be as self-sufficient as possible, reaching backward into activities that will protect the quantity and quality of their inputs, and forward to insure outlets for their products. The government has identified as one of its more general goals the promotion of a greatly enhanced degree of "horizontality", urging enterprises to reduce their autarchic practices, to foster trade with independent supplying enterprises, and to support the extension of independent wholesale and retail trading. In these early stages of reform, the practical results of such exhortation are still quite limited.

The effects of this predilection for self-sufficiency have been very marked in the realm of vocational education and technical training. We describe below the intricate divisions among training institutions, sponsoring enterprises and agencies, and government oversight bureaus. Their complexities are not easy to grasp, but their existence has clearly much to do with the fact that the major industries of China have felt themselves unable to rely on others to supply them with even the minimum quantity and quality of skilled and semi-skilled labor they needed. In that sense, it is difficult to talk of a "market" for such labor, as that term is used in Western industrialized economies.

China's arrangements for VTE are marked by the exceptionally large share of the total effort that is made by the enterprises themselves. While other countries, for example, Britain, France, and the United States, are trying to find ways to involve employers more closely with secondary education in general, and VTE in particular, China has already concentrated over half of its secondary VTE enrollments in establishments with close ties to enterprises (STS and Skilled Worker Schools), and the others in schools (SVS) that have every incentive to build those ties. However, enterprise-linked schools have been charged more with the provision of pre-service, rather than in-service, technical training of skilled and semi-skilled workers, and this has had severe consequences for the overall level of technical skills embodied in China's work force.

Over and over again we heard that the quantity and quality of China's skilled and semi-skilled manpower are grossly inadequate, especially for staffing the industrial and commercial development that is being projected: "The work force is characterized by a low percentage of skilled workers, technicians, and trained managers..." (World Bank, 1985, p. 24). Present inadequacies may be attributed partly to the political turmoil affecting all of secondary education during the Cultural Revolution, but this is not the whole story.

For reasons that are deeply rooted in the Chinese economy and polity, pre-service vocational and technical education has a history of severe underfunding by government, an underfunding that has more than offset the efforts (also insufficient relative to the needs of the economy) of the enterprises (Orr and Orr, 1985, p.1; World Bank, 1983a, pp. 138-139). Moreover, enterprise training resources have not been employed efficiently:

1. training has been located in units that are probably too small to capture economies of scale;

2. curricula in technical training are severely specialized and narrow;

3. in the past a large part of training resources has gone to support remedial general education and political and ideological education;

4. even now, training resources of firms must be devoted to training workers after they have been hired, but before they begin work, because their pre-service training has been inadequate. It is estimated that this affects 6 million workers annually;

5. the time taken to complete courses is excessive by international standards, with trainees taking three or even four years to cover material that is encompassed in at most a year or 18 months in Western industrialized nations;

For more details and substantiation of these comments, see the recent report on internal efficiency of the training system in China (McGough, Cochrane, and Leung, 1987).

Despite these elements of inefficiency, more generous levels of investment in education and training closely oriented to the needs of the economy would presumably have yielded sizeable returns to society. There has been a striking contradiction between the national interest which called for a greater training effort and the national practice of less than adequate commitment of resources.

The explanation for this contradiction probably lies in the strongly egalitarian emphasis of China's Communist Party ideology, an emphasis that has been substantially modified in only the most recent years, and is still not without its determined defenders. China has followed the familiar socialist path of establishing highly specified, and firmly implemented, schedules of salaries and wages, bonuses, and fringe benefits. (See Byrd and Tidrick, 1985: 28-31, for a discussion of labor incentives.) Workers have become accustomed to being paid at fairly uniform and stable rates irrespective of their own performance, or the performance of the unit to which they are attached.

On the enterprises' side, however, the existence of a tied labor force and a compressed wage structure could be expected to encourage the supply of training. The Chinese manager has been in the enviable position that a worker, once trained, could rarely quit to go to another job. He would have to get permission from both his present manager and the local Labor Bureau. These permissions have been hard to obtain. Moreover, the locked-in worker did not have to be automatically raised in grade-level, simply because he had successfully completed a course of in-service training and had raised his productivity. Even if he were raised in grade-level, it would still be possible to pay him at the previous rate. And even if he were paid at a higher rate, the increment would be typically modest: "... since (1957) wages have been frozen for long periods of time and promotion of individual workers on any principle other than length of service has been rare." (Byrd and Tidrick, 1985: 28). All of this should have led to abundant investment in training by the enterprises. Yet, it has not happened, perhaps because managers have not been able to retain or use the profits that might arise from increased worker productivity.

An important brake on enterprise-financed training has been the Ministry of Finance's power to define and approve allowable expenses of enterprises. These controls have been by no means generous toward vocational education and training, and they have effectively undercut what might otherwise have been a strong supply of training opportunities. Chinese enterprise managers drew the conclusion that the government preferred the combination of low individual worker productivity and large numbers in employment to the alternative combination of higher worker productivity and lesser total employment. In addition, the Chinese enterprise has traditionally served multiple objectives, of which profit is only one. Providing employment has been an overriding social goal for more than three decades, as has worker welfare. Given the Party's commitment to full employment, and given the isolation of China's economy from the rest of the world, the relative neglect of vocational and technical training has had about it a certain rationality, however damaging it may have been for medium and long-term development prospects.

The signals from Beijing have now changed. In a China that is open to the world, and that must compete on world markets for customers for its products, the skill-levels of workers are critical factors. Education in general, and vocational and technical training in particular, are to be given much higher priority, but as yet it is too early to say whether the controls which have inhibited factory managers' training initiatives in the past will be rapidly and effectively swept away.

As these controls are relaxed, and the potential grows for increased worker mobility, questions regarding the incentives for workers to take training may arise. Currently, workers are assigned to training by managers. Given little opportunity for changing jobs and few alternatives for the use of their time, workers accept training as an integral part of their work. Relaxation of restrictions on labor mobility may increase workers' willingness to seek training that is

seen as likely to result in higher earnings. But greater labor mobility is also likely, pari passu, to reduce the enterprise's willingness to offer training.

Three Issues

Three linked issues emerge from the economic context.

I. The first concerns the implication of economic reforms for labor markets and hence for VTE policy: to what extent will the reforms lead to increased labor mobility and truly competitive labor markets? And, if these do appear, what will be their effect, in turn, on the willingness of enterprises to continue to finance and provide training under conditions of higher labor mobility? (This last question has already received substantial attention by Orr and Orr, 1985.) Evidence from Liaoning and Hubei provinces can provide some partial answers to these questions.

On the basic question of whether the reforms will significantly increase labor mobility, managers did not appear to believe that this would become a serious problem (or, for that matter, a substantial benefit). The manager of an enterprise in Liaoning with 6,000 workers felt that labor mobility within the region might increase somewhat, but not enough to allow him to attract sufficient numbers of skilled workers from elsewhere. Moreover, the enterprises with relevant skills were all under the same technical ministry and industrial bureau. Hence, mobility within the industry would not represent either a net loss or net gain.

In Wuhan, another factory manager was more concerned about the problems he faced in finding work for young people who had been assigned to him (after he had lost no fewer than 4,000 employees to retirement, over half his total staff, in 1984), than about labor mobility. Strongly in evidence was the traditional view of factory employment as a lifetime commitment by the worker to a specific factory, and by the factory to each worker.

In Beijing, officials doubted that the newly-introduced contract labor system will have any major impact on the structure of the industry's labor force for another 5 to 10 years. Even then, very little mobility of labor across geographic areas was envisaged, partly for cultural reasons ("the Chinese worker is reluctant to move from his native city"), partly for institutional reasons (he has his living quarters, pension, children's education, and wife's employment all tied to his present place of employment). There may be some increase in labor mobility among enterprises in the same city, but it is all too soon to say whether contract workers will indeed take advantage of the expiration of their contracts to seek out better opportunities. As long as wage differentials among firms remain small, inter-firm labor mobility is also likely to remain low.

On the subsidiary question of whether, given higher mobility of labor, the willingness of enterprises to commit resources to training would be adversely affected, managers, planners and

researchers all believed skilled labor was in such short supply that enterprises would have to continue (and even increase) their own training efforts if they were to satisfy their skilled labor requirements. The Liaoning manager, who was interviewed intensively, felt that training would be the key to improve productivity, and that even under conditions of increased mobility, the firm would need to continue to train, particularly for technical skills. While his role in general education might decline, he saw no alternative source of skills.

The Wuhan manager similarly was planning to increase substantially his training effort. Since 1983, he himself had become director of the factory's Vocational Education Center. Our respondent at the refrigerator factory in Shashi City (Hubei province) was even more definite that the future held only more training responsibilities for the enterprise. Currently planned was the conversion of an old factory building to house a vocational school and workers' cultural center, combined. Over the last three years, the factory had spent Y430,000 on its workers' external training. This will continue, and by 1990 it is hoped to have all workers brought up from the present average skill-level of Grade 3 to a minimum of Grade 4. This respondent believed that the demands on skills made by the introduction of advanced technology would be the driving force behind enterprises' need to increase their training efforts. He pointed out that before 1973 when his factory was making, not refrigerators, but small metal assemblies, its training effort was virtually non-existent. This effort has grown along with the introduction of new machinery and technology, which itself has been a product of the economic reforms.

In Beijing, officials in both the State Planning Commission and the Ministry of Machine Building took a similar view. Two reasons were offered for a likely net increase in training effort: (1) the demand for product quality in an increasingly competitive market can be satisfied only with a more highly trained work force and (2) technological progress will mandate increased training at the enterprise level. However, it was thought that smaller enterprises may hesitate to invest money in worker training, especially if the training does not clearly lead to higher labor productivity. On balance, it was believed that point (1) above would be so strong as to outweigh any incentive to reduce training investments by enterprises. Finally, it was noted that the previous mode of economic control encouraged short-term thinking on the part of managers, who had little incentive to train if the State taxed away most, if not all, of their profits. Under the reformed system, managers can, and will, take a long-term view, and this will include investment in more training, along with investment in improved technology.

In addition, officials also differentiated between some sectors (e.g., agricultural machinery construction) that will diminish in employment, and hence in training needs, as a result of the reforms; and other sectors (e.g., energy production, instrumentation and machine control) that will increase. It was thought that the balance overall would be distinctly positive for training, especially because

competition among firms in the same sector will force firms to emphasize training, in order to be able to produce higher quality output.

II. The second issue flows from the alleged, and no doubt to some extent real, need for significant increases in the number of technicians to be trained and important improvement in the quality of technicians graduated. How can the employment and training system adjust to the need to expand technician training, incorporating changes in the content of training to meet the more demanding skill requirements of both the advanced production technology to be introduced and the higher quality output to be sold on world markets? We deal with this issue in extended manner in the following sections of the report.

III. The third issue speaks to the possible remedial effects of more realistic earnings differentials for skills on the propensity of enterprise managers to misallocate and waste skilled workers on jobs that could be done by lesser skilled employees. To what extent can a reform of the wage structure relieve part of the pressure currently placed on the VTE system, by inducing managers to use what they already have more efficiently, instead of always asking for ever larger numbers of trained people?

This issue is beyond the bounds of our data, and cannot therefore be treated here, even though it is of critical importance. However successful a VTE system may be in training the numbers and types of skilled workers called for by government and/or employers, if those workers are subsequently allocated poorly in employment (because the wage signals to managers are inappropriate), severe problems will surely arise for the VTE institutions. It seems that there is growing recognition of this among Chinese officials and managers alike. Short of a substantial degree of loosening of the rigid and compressed wage structure, the pressure of demand on VTE institutions is unlikely to abate, and managers' complaints about the shortage of skilled personnel are likely to continue.

II. PLANNING

The Structure of Secondary VTE

There are three kinds of secondary vocational schools in China: Skilled Workers Schools (SWS), Secondary Technical Schools (STS), and Secondary Vocational Schools (SVS). These schools are owned and run by a wide variety of enterprises and government units, under differing national policy bodies (Figure 1).

Figure 1: Structure of Secondary VTE

Type and Skill-level-	Enroll From	Length of Course	Policy Body	Owned/Managed By:
Skilled Worker Schools (SWS) Mid-level Workers	Junior Secondary	3 years	Ministry of Labor and Personnel	Technical Ministries; Municipal technical bureaus & enterprises owned by municipalities
Secondary Technical Schools (STS) Technicians	Junior Secondary	4 years	State Education Commission	Technical Ministries Municipal & Provincial labor & technical bureaus; Enterprises
Secondary Vocational Schools (SVS) Mid-level Workers and Technicians	Junior Secondary	3 years	State Education Commission	District, Municipal education bureaus

As shown, both SWS and SVS train middle level workers to enter at Grades 2-4 on the eight-grade unified workers' salary schedule used across China. STS train technicians who enter employment on the cadre wage scale, usually at grade 24 (Munch and Risler, 1986, p. 82). There are two types of STS: pre-service and in-service. The latter are typically established and run by large firms. Pre-service STS are

just completing the process of shifting from enrolling senior secondary graduates to taking junior secondary graduates, and adding a fourth year to the curriculum. In some cases, a few selected STS will continue to enroll senior secondary graduates for more "technical" skill areas.

In all, there are about 15,000 VTE schools run by local education bureaus, technical ministries, and enterprises (Table 2). Of these, 347 were designated national "key" SVS in 1980, on the basis of the quality of their management, teaching staff qualifications, teaching performance, and equipment. Since 1980, the number has shrunk a little, but these schools continue to receive extra funds from the State (mainly to purchase equipment). In addition, there are a further 600-700 schools designated as "main stream" schools by provincial auth rities. However, the State Education Commission considers that even these schools are seriously below standard in many respects.

Table 2: Secondary Vocational and Technical Training: Institutions and Enrollments: 1985

	Number of Institutions	Enrollment Capacity	Enrollment
SWS (1985)*	3,548	1,300,000	740,000
of which:			(of whom,
Run by national			190,000 are
Ministries and			in-service)
and Commissions	945		
Run by			
enterprises	1,621		
Run by			
provinces	412		
STS	3,557	?	1,571,100
of which:			
Teacher			
training	1,028		558,200
SVS	8,070	?	2,295,700
Total Voc. and Tech. Training			4,606,800
Total Upper Sec. Gen. Education			7,411,300

*Source: Ministry of Labor and Personnel.
Other data from Statistical Yearbook of China, 1985.

Table 2 provides data on the number of schools of each type and their enrollments. Note the severe under-enrollment in the SWS, a signal that incentives to take training, especially in-service, may be too weak.

The complex structure of provision has both historic and pragmatic rationales. Schools run by enterprises under the Ministry of Labor and Personnel originated in the 1950s during the first great expansion of Chinese industry. The work force was largely uneducated and poorly trained, and enterprises were required to establish schools which provided both general education and skills training. The (then) Ministry of Education managed general education only.

At the end of the 1970s, the enterprise schools, many of which were closed during the Cultural Revolution, reopened -- again with the burden of providing compensatory general education for millions who had had no access to schooling during the Cultural Revolution. In the schools studied, the compensatory education task was nearing completion, and enterprise-run SWS were providing various forms of in-service training in addition to vocational education for junior secondary school graduates. At the same time, the ministry of education began converting general education secondary schools to SVS status and adding vocational courses to general education schools, in recognition of the need for skilled workers.

Many STS schools have a long history, often having been expanded since 1949 on the basis of pre-Liberation institutions. Until recently, most STS were owned and operated by the many technical Ministries, for example, the Ministries of Machine Building, Electronics, Textiles, and so on. Under the new decentralization policies, the ownership and oversight of STS have been largely consigned to local governmental authorities, and at the central level their work is now formally under the successor department to the Ministry of Education, reorganized as the State Education Commission. However, their links to enterprises remain strong. As has been noted, they train to a higher level than do SWS or SVS. Entrance to the STS is governed by the same bureaus that assign students to higher education, and competition for STS places is very keen. Once admitted, a student's graduation is virtually assured (this is true also of students in the SWS and SVS schools); and once graduated, the newly skilled young person is assigned to a job, usually in the skill area and industry in which he/she was trained.

It is important to recognize that the separate names given to these different school types conceal a good deal of overlap in actual work and function. A complaint made by the State Education Commission is that, although at the center they have a quite clear idea about the proper functions of each type of school, at the local level schools often work "out of strict line," and take on tasks that are not within their "contract" function. Further, a representative of the National Committee on Workers Education emphasized that in-service VTE, in particular, was a maze of overlapping and largely uncoordinated institutions and arrangements. He viewed the "coordination and

unification" of the in-service training scene as one of the National Committee's primary tasks.

Pragmatically, diversified and decentralized ownership and financing of vocational schools provided -- and continue to provide --a mechanism for resource mobilization and for the decentralized adjustment of manpower supply and demand. Both characteristics are of considerable importance in a country as large and diverse as China. By running their own school Ministries and enterprises could supply themselves with at least part of the skilled labor they needed. In addition, China has developed either by design or accident, a network of VTE training arrangements that are in close touch with employing organizations, often financed and operated by the enterprises themselves.

However, there has been a price for this, paid in terms of narrowness of training curricula, small-scale training establishments, and extreme difficulty in finding adequate numbers of experienced and trained instructors. In addition, the complexity of the VTE structure, with its various combinations of government and enterprise authorities, could be seen as cumbersome and potentially harmful to effective system management and production of appropriate numbers and types of skilled workers. The planning process is indeed complex on paper. However, as will be discussed, it operates with considerable flexibility and local autonomy.

Planning Units

The planning process is operated by a set of vertically organized national-level ministries and commissions (the latter holding higher rank). These include: the State Planning Commission, the State Education Commission, the Ministry of Labor and Personnel, the Ministry of Finance, and other "technical ministries" (such as Machine Building, Electronics, and Mining and Metallurgy) which operate both SWS and STS. Each of these is replicated through Provincial offices down to the level of municipalities (and often districts), creating local structures more or less parallel to the structure at the national level.

Thus, there are provincial and municipal labor, finance, education and technical bureaus, and provincial and municipal planning commissions. Both enterprises and schools are owned by provincial and municipal level units in all technical fields, including those agencies (Labor and Education) that, in addition to owning and managing pieces of the VTE system, plan together for the system as a whole.

Like the economy, the administrative structure is highly segmented and oriented toward vertical flows of command and response. Planning for VTE, however, requires that elements of this segmented system coordinate activities in significant ways, in the effort to match the supply of skilled labor to the demand.

At the national level, policy changes are typically implemented by means of formal agreements among the authorities concerned and by publication of a formal document. At the time of our mission, the State Education Commission had published documents and signed agreements with regard to VTE as shown in Figure 3.

Figure 3: Secondary VTE Policy Documents

Document No.	Purpose	Cosigners
001	To resolve problems of cooperation between schools and enterprises	--
002	To strengthen teacher training	--
109	To provide funds to senior secondary schools for VTE courses	--
013	To facilitate the employment of senior secondary school graduates, and to establish the principle that graduates will be paid according to their exam results	Ministry of Labor and Personnel
111	To establish principles for the financing of STS	Ministry of Finance

Signed, but not yet published, was a further agreement stipulating provisions for the establishment and rehabilitation of STS. Discussions are proceeding on agreements that will govern ideological education, the length of courses, the "training before employment" policy, rural VTE, and the regulation of SWS.

Planning Method

The State Education Commission believes that the growth rates of the economy and of VTE enrollment should be closely associated. Previous five-year plans are now criticized for having neglected this relationship, and a more generous share of the GNP is to go to the education sector. It is expected that the share of public expenditures on education will rise from just over 3 percent in the

recent past to about 4.0 percent in 1990. However, there is no special office charged with estimating the optimum relationship between enrollments and expenditures on VTE and the GNP. In practice, the State Education Commission coordinates this type of work which is replicated at the provincial level by the provincial Education Commissions. However, extensive decentralization of financing to provincial and municipal levels has made it difficult to measure levels of finance accurately.

China follows the familiar method of manpower "balances" in establishing training needs. This is essentially a four-stage approach: (1) determine the size of existing and prospective stocks of manpower of various types, taking into account losses by way of retirements from the labor force and additions from current enrollments in training institutions; (2) determine the total requirements for labor year-by-year for the planning period, based upon labor coefficients per unit of output assigned to each enterprise, and taking into account the impact of anticipated technological innovations; (3) subtract the size of stocks from the estimated need and determine the size of the training effort needed to bring stocks up to the level of need; (4) determine the feasibility of the estimated training effort, and make appropriate adjustments on both the demand (need) and supply (training) side to bring the two into balance by the end of the planning period.

Demand Planning

Manpower forecasting in China is effectively decentralized to provinces and municipalities. Overall employment targets are established by provinces for each year of the current five-year plan. These targets -- based on general projections for growth in various sectors -- are expressed only in terms of numbers to be employed, and they do not seem to serve as tight constraints on the provincial Education Commissions. Rather, they are used by provincial authorities as guidelines for planning.

Within this general context, the annual manpower planning exercise at the provincial level is most important. Enterprises develop estimates of the numbers of new employees needed by specialization and level of education for the coming year. In enterprises, these are typically based on plans for expansion of production.

The first round of plan review begins when these employment requirements are submitted to the Labor and Personnel Bureau and the Planning Commission at the level at which the enterprise is owned. Thus, municipally owned enterprises submit to the municipal Labor and Personnel Bureau and Planning Commission; provincially owned enterprises to these same bureaus at the provincial level. It is reported that the most intensive review of skill requirements takes place at this initial level. Plans at the municipal level are consolidated and forwarded to the Provincial Labor and Personnel Bureau.

At the provincial level plans are consolidated and compared to provincial employment targets by the Labor and Personnel Bureau and the Planning Commission. Provisional employment quotas for enterprises by level -- worker, technician, cadre -- are established, and the projections forwarded independently by the Provincial Labor and Personnel Bureau to the Ministry of Labor and Personnel and by the Provincial Planning Commission to the State Planning Commission.

The Ministry of Labor and Personnel and State Planning Commission consult and reach agreement on employment quotas. These are then sent to central technical ministries, provincial Planning Commissions and provincial Labor and Personnel Bureaus. These two latter in turn consult and pass final employment totals down the line to enterprises.

Supply Planning

Enrollment planning is based on employment targets and seeks to match enrollments with the projections for employment (by specialty, school type, and level) for the future period coinciding with graduation of current entrants to the schools (i.e., three of four years later). As with labor planning, this is done on an annual basis within the context of broad five-year targets and general national policies (such as the target of 50:50 ratio of secondary vocational to secondary general enrollments, and the "training before employment" recommendation).

Significantly, more attention is paid at the State level to setting enrollment quotas for the STS than for the other types of schools. According to a spokesman of the State Planning Commission, his Commission virtually ignores the SWS (because their enrollments are small) and also the SVS (because the skill-levels of graduates are so low). This means that planning for SVS, in particular, is above all a provincial and even a local municipal function, while provision for the SWS is seen as the responsibility of the technical ministries, enterprises, labor bureaus, and municipalities.

Planning in Hubei Province

In Hubei province, for example, a Manpower Planning Office has now been organized on an inter-agency basis with representatives from the provincial Education Commission, Labor and Personnel Bureau, and the provincial Planning Commission. Their task is to forecast manpower needs on the basis of information collected from the provincial industrial (technical) bureaus, who have surveyed their enterprises. The Manpower Planning Office's report containing manpower estimates then goes to the provincial Education Commission, and the Planning Commission will work with the Education Commission to allocate the overall numbers to be trained, by specialty and level. Table 3 shows the results of the process of enrollment planning for Hubei province, as of mid-October 1986. It is worth noting that a breakdown into specialities was not available.

Table 3. Enrollment Planning
Hubei Province 7th 5-Year Plan for Vocational and Technical Educational Development
1986-1990

	1985 Enrollment	1990 Target	Need
1. Rural Agricultural-Vocational Schools	122.4	200.0	77.6
of which:			
In urban locations	26.0	56.0	30.0
In town/country locs.	17.7	32.0	14.3
In rural locations	78.7	112.0	33.3
2. SWS	34.2	65.0	30.8
3. STS	60.1	90.0	29.9
of which:			
In secondary normal schools	23.2	27.8	3.8
TOTAL: Voc.Tech. Schools	216.7	355.0	138.3
Senior Secondary General Education Schools	366.0	360.0	-6.0
TOTAL: Secondary	582.7	715.0	132.3
of which:			
Voc./Tech.	37.18%	49.65%	
General	62.81%	50.35%	

(In thousands)

Source: Provincial Education Commission, Hubei Province

The Provincial Education Commission will then allocate quotas for admission to the schools, except for municipally-operated schools (where the municipality receives the overall numbers and makes the allocations to the schools). SVS receive "indicative" quotas: they are expected to exercise a good deal of discretion in adjusting the indicative quotas to local constraints and potentials. STS and SWS, on the other hand, are given "imperative" quotas, which they are expected to fill, but not exceed unless they can find supplementary funds from enterprises who are willing to pay for some extra training "on contract."

In Hubei province, the Manpower Planning Office is not expected to be a permanent establishment; it will be dissolved for the time being when its work on forecasting for the 7th Five-Year Plan (1985-1990) is done.

If a new school is required to take care of training needs, permission must be gained from a variety of authorities, depending on the particular type of VTE school:

Permission required from:

STS: Provincial Education Commission, Provincial Economic Commission, Provincial Finance Bureau

SWS: Provincial Economic Commission, Provincial Labor and Personnel Bureau, Provincial Finance Bureau, Deputy Governor of Province

SVS: Provincial Education Commission only

The Ministry of Finance sets cost standards for STS and SWS at about 50 percent of the standard college student cost in the same sector of industry; at about 50 percent of average college education costs for teacher training; and about 50 percent above the cost standard for general education schools for the SVS. As far as SVS are concerned, the Provincial Finance Bureau does not have a voice in the decision to establish or deny a new school. If the Education Commission has approved, the Finance Bureau must pay out the required funds from its Education Account. If budgeted funds are insufficient, the Finance Bureau may tap its reserve funds, and/or request a supplementary grant from the State.

A proposal for a new SWS will go to the provincial Labor and Personnel Bureau, the Planning Commission, the Education Commission, and the Finance Bureau. All must signify their approval, though permission is no longer required from the relevant technical ministry. If approval is given, it will be made in terms of a specific size, specialty, and "grade." ("Grade" refers to the "quality" of the school as revealed by the number and qualifications of the teaching establishment authorized and by the director's educational level and cadre-grade.) If the SWS is to be run by an industrial bureau, the Finance Bureau will provide the recurrent costs, but if it is to be an enterprise-school, then the enterprise will be expected to pick up the recurrent costs. As a final step, in the case of a new SWS, the express permission of the provincial Deputy Governor charged with overseeing education and training must be obtained.

In Hubei province, and doubtless in other provinces, too, the process of planning approval for a new (additional) course of study also differs according to type of VTE school. Some examples follow:

SVS: Assume the need is expressed for a new course of study to prepare personal computer operators (a school director, or in the case of a PC operator course, a municipality's Economic Commission might take this initiative). The Economic Commission will ask the school to work up a proposal and report back to the Economic Commission. When this stage is completed to the satisfaction of both parties, the Economic Commission will recommend the proposal to the

municipal Education Commission. If it gains support there, the Education Commission will jointly approve the proposal together with the municipal Planning Commission and the municipal Finance Bureau. The Finance Bureau can hold up implementation by pleading lack of funds, and asking for some delay until funds are available, but in general, proposals that get as far as assent by both the Education Commission and the Economic Commission will be implemented. Provincial authorities will not be involved, for they cover none of the recurrent expenditures for Hubei's SVS (all of the province's SVS being run by municipalities and districts).

STS: A new STS program to train, say, machinists using computer-controlled tools, would most likely be initiated by the school director, who would report his need to the relevant municipal bureau (in this case, the Industry Bureau). Given local approval by the Industry Bureau, the proposal will be reported up to the provincial Industry Bureau, who will in turn report it to the provincial Education Commission. At this point, the provincial Education Commission and Planning Commission will discuss the proposal, and if it is acceptable, approve it jointly. For a new course (as distinct from a proposal for a new school), Finance Bureau approval is not needed.

SWS: A new course for the SWS training of welders must follow much the same path of planning permission as for a new SWS school, beginning with the provincial Labor and Personnel Bureau, and going through all the stages mentioned above, except for the last approval by a Deputy Governor, which in this case is not needed.

Hubei province's program for upgrading the quantity, quality, and status of VTE comprises four main elements: (1) each municipality should have one or two efficiently run well-equipped vocational-technical training centers, established and administered by the provincial government for demonstration purposes. Special funds have been allotted for the centers by the provincial government, and there are already centers in six cities; (2) each county should have one well-run "key" vocational school, to provide courses of particular value to the local economy. These schools should be on an equal footing with "key" general education schools for priority allocation of teachers and equipment. Forty-one such "key" vocational schools are planned, and they are to receive special subsidies of Y120,000-Y150,000 to purchase equipment; (3) vocational programs will be instituted in general education high schools. This is likely to be a long process, because full implementation will require fundamental change in school procedures, which till now give little or no room for elective courses; (4) reforms of the labor recruitment system will be pushed ahead as fast as possible, in particular the "training before employment" system. Once the new approach has taken hold, it is expected that the development of VTE in Hubei will go ahead even more vigorously.

The overall pattern of VTE development will be to strengthen the free-standing schools, such as STS and SVS, to insert vocational programs in general education high schools, and to develop the enterprise-based skilled workers schools (SWS). By embracing this

multiple, and even complex, structure of provision, the province hopes to significantly enhance prospects of success in meeting demands for skilled workers.

Two Hubei Cities: Wuhan and Shashi

Wuhan, Hubei province, is a city with 6 million inhabitants. The city is highly industrialized. It is an important Yangtze River port town, and it is the administrative capital of a province of 50 million people. Vocational education at the secondary level began as far back as 1891 in Wuhan and is very well developed by Chinese standards. Within the boundaries of Wuhan City are located: 25 STS (enrollment, 9,200); 31 SWS (10,200); 5 SVS (860); and a further 19,300 students enrolled in SVS "wings" built onto existing secondary schools. This represents a total enrollment of 39,560 in regular secondary vocational and technical education, to which must be added a further 3,700 students enrolled in TV study courses, for a total VTE enrollment of 43,260. This last figure represents 36 percent of total student enrollment at the secondary level -- general and vocational/technical combined. The provincial authorities are planning to bring the enrollment mix more into line with the State's 50:50 target during the current five-year plan, by admitting 4 students to VTE for every 5 admitted to general education schools, moving the ratio from 36:44 towards 44:56. The goal is to train more than 100,000 junior managers, technicians, and skilled workers for Wuhan's comprehensively reformed economy by 1990. At present, 2.9 percent of the labor force is trained to the level of engineer (higher education) or technician (secondary education). The municipal authorities believe this figure should be nearer 8 percent, and they look forward to reaching this target in part with the help of funds and technical assistance offered by the Federal Republic of Germany (FRG).

It is evident that in Wuhan, the development of VTE is proceeding energetically, and will probably go ahead strongly in the future. Although our Chinese respondents were (justifiably) proud of their achievements and their plans, the adequacy of a system with a capacity of only 40,000 to 54,000 VTE students to serve an important industrial, commercial, and administrative center of 6 million inhabitants remains questionable. Of course, the paucity of training places relative to the size of the present and prospective labor force is by no means unique to Wuhan, but may be said to characterize China as a whole. Some sense of the shortfall in training opportunities may be gathered by comparing Wuhan (6 million inhabitants) with the entire country of Denmark (5 million inhabitants). In Denmark, 80 percent of the young people begin some vocational training following on immediately from their general schooling; yet others start vocational training later. The total effort is estimated to involve roughly 100,000 young people at any given time, that is, two and a half times Wuhan's for a population only about five-sixths the size. (CEDEFOP, 1982: 104, 126-130)

Also located in Hubei province, and also on the Yangtze River is the rapidly developing town of Shashi, with a current population of 270,000. The economy of the town is based on light industry (textiles,

light and medium engineering, and metal products). The expansion of VTE at the secondary level has been very fast. In 1977, there were 13 students enrolled in general secondary schools (junior and senior) for each student in VTE. In 1986, the ratio had become 1.78 to 1. By 1985, Shashi had 5 STS, 16 SVS, and 6 SWS. Enrollments in all three types of school together numbered 5,200 which equalled 64 percent of all students in senior secondary education. A total of 28 specializations are currently being offered in the VTE schools. In 1983, the municipal Labor and Personnel Bureau began to offer short-term VTE courses to junior middle school graduates who were unable to secure a place in full-time regular VTE. There are currently (1986) 33 short-term classes running, with a total enrollment of 986 students. The municipality has also established (1983) a higher institute for VTE; it has admitted 160 graduates of senior secondary schools to a three-year course. Its graduates are assigned to jobs in the order of their academic performance.

The graduates of the town's STS, SWS, and SVS mostly enter work with a Grade 3 skill-level, and our respondents in Shashi claimed that VTE has been responsible for doubling output per worker over the two-year period, 1984 and 1985.

In 1983, the municipality issued a six-point set of instructions governing VTE and employment (Document No. 68). The six points are as follows: (1) each enterprise must have a training quota for all newly hired workers, and no untrained workers may be hired ("training before employment"); (2) the hiring of children of the enterprise's workers is no longer allowed; (3) the municipal Labor and Personnel Bureau must exercise stricter control over State enterprises' wage bills, and State enterprises must get Labor and Personnel Bureau permission before hiring and paying new workers; (4) wage differentials for higher training and skill-level must be recognized and paid (the present base pay wages are set as follows: Grade 1 worker, Y40 per month; Grade 2, Y48; Grade 3, Y56; Grade 4, Y64); (5) all new workers must show a labor record book and a graduation certification from a school. Job-waiting youth must register with the Labor and Personnel Bureau and be given a job-registration certificate; (6) training done by schools on behalf of enterprises is to be encouraged, and paid for by the enterprises.

VTE in Shashi currently operates in 5 modes:

1. large enterprises run their own VTE schools independently;
2. small enterprises collaborate to run schools jointly;
3. large enterprises run schools jointly with the municipal Education Bureau;
4. enterprises contract with VTE schools outside their own control to train their workers;
5. the municipal Education Bureau runs schools.

It is planned to continue this multi-faceted approach, but the municipality's Education Bureau hopes that it will be able to strengthen its "leadership" (control?) over VTE in the future, by codifying the rules and regulations governing VTE, to bring more order into a very "untidy" system by establishing a new section devoted to VTE and a VTE research unit; and by improving syllabi and planning structures for VTE.

The 1984 skill-composition of Shashi's labor force, and the targets for 1990 are as follows:

Table 4: Skill Composition of the Labor Force, Shashi City, 1984

Percentages of the Total Labor Force

	1984	1990
Engineers and Technicians	2.84	8-10
Highly Skilled Workers	0.5	10
Medium Skilled Workers	10.3	50

Source: Shashi Municipal Education Commission

These targets are to be achieved by restructuring the intake into senior secondary schooling, as follows: By 1990, of the 4,000 junior-middle school graduates, 25% will enter senior general education schools, 12.5% will enter STS, and 50% will enter SWS or SVS. An important part of Shashi's plans for developing VTE to 1990 will be the expansion of STS, which are expected to graduate about 3,000 students by that date. In addition, 11,000 will graduate from college-level courses, and 8,000 from SWS and SVS by 1990. Five hundred additional VTE teachers will be trained, and a vocation education center is being established to house development and demonstration work, especially in new curricula.

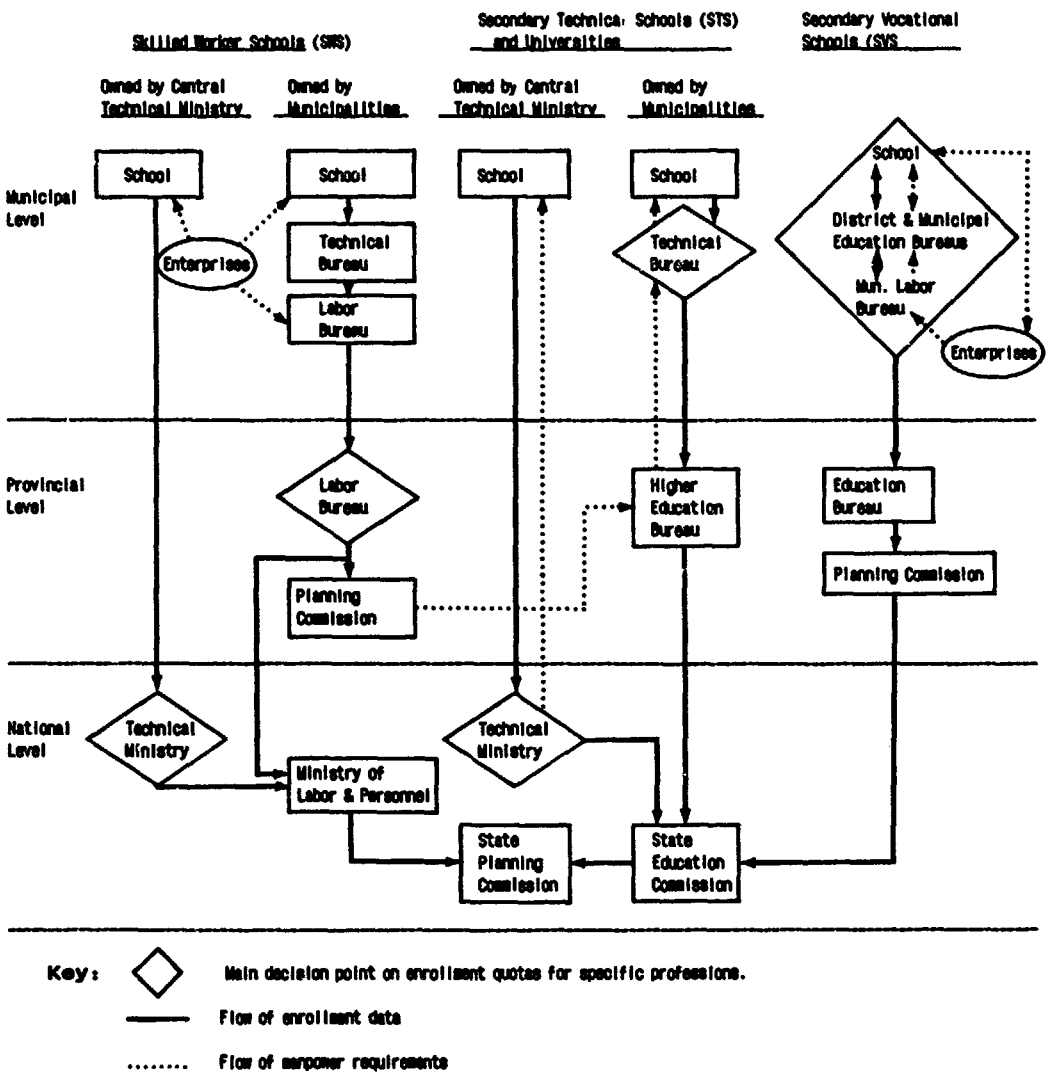
The commitment and preparatory planning work of the Shashi municipal authorities are very impressive. All the major elements for significant achievement are present: forceful, but collegial, leadership; a multi-faceted approach to VTE, with enterprises and government authorities involved independently and jointly; close consultation with employers and the possibility of adapting VTE offerings to changing employment needs; strong demand for senior secondary education, combined with restriction on entry into general

education schools, to boost the academic level of entrants into VTE; and excess demand for graduates in the city, as industrial and commercial development stimulated by the economic reforms goes ahead. The two problems emphasized were lack of equipment and lack of trained, experienced teachers. Other problems, not specifically mentioned, but no doubt recognized are: in the enthusiasm for change, there is a danger of overestimating what is possible in short time-periods, and thus courting a backlash against VTE arising from disappointment and frustration; the possibility that the best students will continue to be reluctant to enter VTE, preferring the higher prestige of the academic stream; and the difficulty (perhaps even the impossibility) of successfully retraining general education teachers to work in VTE settings.

Planning in Liaoning Province

Another view of the complexities of VTE planning may be gained from Liaoning province (see Figure 4). A notable feature of planning is the considerable latitude to adapt to local situations. For example, in Hubei, a Provincial Education Commission has been established to integrate the work of the still separate Higher Education Bureau and Education Bureau of Liaoning. The Hubei and Liaoning processes, as described, serve then as a general guide to provincial planning systems, and they identify key aspects of the system of matching enrollments to manpower requests.

Figure 4: VTE Planning Process in Liaoning Province



The flow of enrollment information is shown for the three kinds of schools: SWS, STS, and SVS. Within each school category, the flow is further detailed for different patterns of school ownership. Solid lines represent the upward flow of projections. Broken lines indicate the flow of information outside of the formal decision-making process. Dotted lines show the flow of employment quota information which triggers enrollment planning. Elements of the system shown in "diamond form" indicate the point in the flow where enrollment decisions are principally made.

A principal feature of the system is that decisions on the match between skill requirements and enrollments are made at different levels in the system for different kinds of schools under different patterns of ownership. For SWS and STS owned by central ministries, enrollment decisions are made at the national level based on plans submitted by the schools. For schools owned by enterprises owned in turn by central ministries, the pattern is the same. In both cases, enrollment projections are driven by the employment plans either of the ministry or, where there is one, the owning enterprise. Information on projected enrollments for these schools is sent to the municipal labor bureau for incorporation in their planning.

For SWS owned either by municipal technical bureaus (representing an industry) or by municipal technical Labor and Personnel Bureau, enrollment targets are set at the school level. The targets are based on enterprise employment projections, and they are forwarded through the municipal Labor and Personnel Bureau to the provincial level, where plans are consolidated. It is at the provincial level where the enrollment quotas by profession are first established. It is reported that these quotas are largely accepted as forwarded to the provincial Planning Commission and independently to the Ministry of Labor and Personnel, where they are consolidated with plans submitted by technical ministries and forwarded to the State Planning Commission.

The pattern for central ministry owned STS follows mainly that for similarly owned SWS; however, the employment target comes from the central ministry, which may in the end assign graduates to positions in other provinces. For STS owned by enterprises and/or supervising technical bureaus at municipal levels, employment targets flow from the provincial Planning Commission through the Higher Education Bureau to the technical bureau, to the enterprise, and thence to the school. Enrollment projections then pass from the school to the technical bureau (which may supervise several enterprises in its area) for decision. These municipal level decisions are then consolidated at the level of the provincial Higher Education Bureau, where they will serve as the basis for assigning students to schools following examinations at a later stage. Provincial projections are forwarded to the State Education Commission in Beijing.

The pattern for the SVS is quite different. Here, schools, district and municipal education bureaus, and municipal Labor and Personnel Bureaus consult annually with enterprises on projected

employment needs as the basis for decisions on enrollments by specialty in a given school. Both formal (labor surveys) and informal (conferences) methods are used to establish manpower needs. These decisions are referred to the provincial education bureau, which consolidates and forwards them to the State Education Commission.

The two main streams of enrollment information -- through the Ministry of Labor and Personnel and the State Education Commission -- are in turn directed to the State Planning Commission. At this level, only total enrollment by type of schools is considered. Approval is said to be more or less routine, and is transmitted back to the schools via the channels through which information arrived.

Both STS and SVS can increase quotas for a given specialty, if requested to do so by an enterprise which is willing to pay the costs of additional training. This requires the approval of the provincial Labor and Personnel Bureau or Education Bureau, respectively. Above-quota training of this sort occurs regularly, and provides an important element of flexibility in meeting local manpower needs outside the formal planning process. SWS also train on contract for other enterprises, but the process seems much more integrated into annual enrollment planning and quotas.

A principal reason for the differences between the SWS and STS on the one hand, and the SVS on the other, lies in the labor assignment process. Students in the SWS and the STS are guaranteed placement by the owning enterprise if they graduate. Since 99% do, admission to either of these types of schools is a decision for employment. In the SVS, however, there is no formal assignment process although, as will be discussed, informal mechanisms in the better schools appear to lead to very high placement rates.

The systems for testing and admission to schools also differ. For the SWS, a nationwide entrance examination is prepared by the Ministry of Labor and Personnel Bureaus (except in Beijing, Shanghai, and Tientsin, which create and administer their own examinations). Students select the specialty in which they wish to enroll before taking the examination. Students are then assigned to schools by the provincial Labor and Personnel Bureau on the basis of their examination marks and specialty selected, until enrollment quotas are filled. Graduates are eventually assigned to jobs by enterprises or by municipal or provincial Labor and Personnel Bureaus, depending on who runs the school directly.

STS apply directly to the Higher Education Bureau for students by specialty based on received enrollment quotas. The Higher Education Bureau administers a national entrance examination prepared by State Education Commission. Students select a specialty before taking the test. A Higher Education Recruitment Commission uses examination scores and student selected specialties to assign students to schools. This Commission is chaired by the Provincial Governor, and includes representatives from the higher education and Labor and

Personnel Bureaus and the Planning Commission. Students are eventually assigned to jobs by the unit that owns the school.

For the SVS, an entrance examination for general and key general secondary schools, and for SVS, is prepared and administered by the provincial education bureau on a city-wide basis. Students select both the type of school and the specialty desired before taking the examination and are assigned to schools by the municipal education bureau.

Data from Anshan City in Liaoning province illustrate the pressure of applicants upon available places. As shown in Table 5, the overall ratio of secondary applicants to enrollments in 1985 was 2.5:1. For key general secondary schools, the ratio was 3.6:1; for SVS, it was 6.9:1; for STS, it was 2.6:1; and for SWS, it was 5.9:1.

Table 5: Applications, Intake, and Examination Cut-Off Scores, Anshan City Secondary Education*

Year		Total	Key Gen. Sec.	Gen. Educ. Sec.	SVS	STS	SWS
1985	Applications	16,797	- 4,267 -		3,451	1,768	7,311
	Intake	6,638	1,200	3,000	500	690	1,248
	Exam Cut-Off		516.5	320	441.5	- na-	-na-
1986	Applications	18,847	- 5,181 -		3,514	2,019	9,153
	Intake	7,536	1,000	3,200	610	905	1,821
	Exam Cut-Off		543	370	473.5	-na-	-na-
Ratio of Applicants to Intake	1985	2.5:1	3.6:1	1.4:1	6.9:1	2.6:1	5.9:1
	1986	2.5:1	5.2:1	1.6:1	5.8:1	2.2:1	5:1
Ratio (Totals) General Secondary to Vocational Enrollments	1985	1.72 : 1 (4,200) (2,348)					
	1986	1.25 : 1 (4,200) (3,336)					

*Source: Education Research Center, Anshan Teachers College

The same examination was used for admission to both types of general secondary schools (key and non-key) and to the SVS, with the admission cutoff score being highest for key general secondary (the best route to higher education) and lowest for general secondary; SVS scores fell in between. STS and SWS tests were, as discussed above, different and comparisons are not possible.

The data document excess demand for secondary places. They also indicate that students applying for SVS were better qualified than those applying to the general secondary schools.

Absent other data, further interpretation is speculative. We do not know what combination of factors led more than half of the applicant pool to select STS and SWS, although the prospect of a job assignment surely plays an important role. Conversations with Anshan educators indicate that the popularity of the SVS among parents has been growing in recent years as the ability of SVS to place students has been demonstrated.

While the planning and execution of skilled manpower requirements and supply are both based on a good deal of formal reporting, decision making, and instructions issued to lower levels, as described above, it is also important to note that all elements of manpower planning are carried on in the context of continuous consultation and discussion. District and municipal labor and education authorities visit schools and enterprises regularly to confer with principals and managers. The extended nature of the planning process requires many meetings, capped by formal provincial level conferences each year. The SVS, particularly, employ many mechanisms for consultation with employers -- labor surveys, formal meetings, shared faculty -- to interact with enterprises.

Curriculum Planning

General education curricula are prescribed nationally by the State Education Commission, with very little local flexibility allowed. These curricula are followed for the general education courses in all three types of vocational schools.

Curricula in the vocational and technical specialties are set by the relevant technical ministries (e.g., by the Ministry of Machine Building for machining courses; the Ministry of Metallurgy for mining and metal testing courses). These are used in both STS and SWS, which are said to have some small flexibility (up to 10% of curriculum hours) to adapt them to local needs. SVS also use these curricula, but they are said to have much greater flexibility for adaptation (up to 30-40%).

Both SVS and SWS report developing curricula and course content to meet local needs. For SWS, this latitude is mostly exercised when an owning enterprise introduces new technology -- and then principally for in-service courses. SVS have and do exercise considerably more authority to create new courses, and require only municipal education bureau approval.

As illustrated in Table 6, the curricula of the SVS surveyed in two of the three provinces (Shaanxi and Liaoning) tend rather more towards specialties transferable among enterprises and/or relevent to the emerging "private" sector -- or self-employment. This is not the case in Hubei Province. Courses in sewing, cooking, accounting, and computer operation fit SVS graduates for a relatively wide range of employers, and represent an entrepreneurial adaptation by the schools to labor market opportunities.

Table 6: Distribution of Curriculum Specializations By Type of School & Sectoral Relevance, Hubei, Shaanxi and Liaoning Provinces, 1986* (In sample of schools surveyed)

Province/ Type of School (number in sample)	Total Number of Specializations offered	Number of Specializations most relevant to industry	Number of Specializations most relevant to commerce and services
Hubei			
SVS (5)	19	12	7
SMS (3)	33	22	11
STS (1)	30	14	16
Shaanxi**			
SVS (10)	26	6	20
STS (10)	37	21	16
Liaoning			
SVS (10)	33	10	23
SMS (10)	25	20	5
STS (5)	16	13	3

*Detailed listing of courses may be found in World Bank (1987)
**No SMSs reported from Shaanxi.

Procedures for the revision of technical curricula, as reported by central technical ministry staff, seem somewhat closed. Conferences of teachers and engineers are held to discuss needed changes, but new technology is said to enter the curriculum primarily via the professional reading of engineers, and in the course of installing new technology by foreign suppliers.

Financial Planning

Financing, like planning for supply and demand, is strongly decentralized to provincial and municipal levels.* Schools are, by and large, financed by their administering units; and these are largely at the provincial and municipal level. The central government plays only a minor direct role in providing financing to the schools.

Both the capital and recurrent costs of STS are provided by the sponsoring unit, either the central technical ministry or municipal and provincial technical and labor bureaus. These schools obtain a relatively minor share of their resources from tuition, school-owned factories, contributions from non-owner enterprises, sale of training services and "other" sources (ranging from 3% to 14% across the two provinces in 1985). A similar pattern prevails for Skilled Worker Schools (SWS), with the exception that a somewhat larger share of revenues is derived from school-owned factories.

Financing for the Secondary Vocational Schools (SVS), however, follows a different pattern. Recurrent cost financing is similar, with approximately 80% being provided by local (principally municipal) governments, and the balance coming from the same sources as the other two types of schools. Included in the revenue flows from local governments is a small subsidy provided to the provinces by the State Education Commission. In 1985 this totalled 50 million yuan; Liaoning's share was 2.5 million yuan, and Hubei's 2.0 million yuan. SEdC expects provinces to use this money to subsidize model schools or resource center schools. In practice, local authorities exercise considerable latitude in the allocation of these funds.

Capital costs, on the other hand, are not routinely provided by sponsoring units. The amount of capital financing for the SVS depends on the initiative of the principal in obtaining financing from local sponsors or local education bureaus.

Standards for recurrent costs established by the Ministry of Finance for STS and SWS establish floors on per student costs. These are currently set at one-half of the standard cost for a college student in the same discipline, but may rise to 70-80% as financially strong sponsors often exceed these targets. There are as yet no recurrent cost standards for the SVS. There is great variation

*For a detailed treatment of VTE financing in China, see Yang (1987).

in per student costs for these schools. The current annual cost standard for STS students is 1,300 yuan; actual annual recurrent costs reported by schools surveyed varied in 1985-86 between 300 and 2400 yuan. Cost standards for the SWS are currently set at 600 yuan per student per year; reported annual recurrent costs ranged from 350 to 2300 yuan. The estimated annual recurrent costs per student in the SVS surveyed ranged from 250 to 950 yuan.

Characteristics of Planning

A number of important conclusions emerge from this description of the various planning processes which guide VTE in China.

First, while the flow of information in the manpower forecasting and planning process is complex, decisions on skill match seem to be effectively decentralized to the lowest possible level. This decentralization, combined with the emphasis on annual plans and a great deal of formal and informal consultation at and below the provincial level may indicate the capacity of the system to make reasonably effective adjustments at the margin as quantitative demands change across levels and specialties.

In addition, one gets the distinct impression that though the authorities are following the formal steps of manpower forecasting and the development of manpower targets and plans, they are not locked into a rigidly deterministic stance toward the figures that are passed back down the line. A great deal of latitude is granted to modify targets and procedures according to local conditions and priorities. This essentially pragmatic view of plan implementation is likely to serve China well, as against a more doctrinaire, authoritarian approach. If only because incentive structures and forms of economic control are changing so fast, no forecasts of skill needs can be expected to give more than the most general guide to the optimum skill-mix of the Chinese labor force 5, 10, or 15 years ahead.

For enterprise-owned SWS, the effective distance between the determination of employment targets and the establishment of the enrollment pattern for the school may be no longer than the walk from enterprise main offices to the school located in the factory complex. STS that serve national manpower needs within an industry are planned for nationally, and SVS enrollments are planned interactively at municipal levels. Only the municipal and provincially-owned STS enrollment decisions are effectively made at the province level. In addition, the ability of SVS and STS to train over-quota further increases local adaptability.

Decentralization of financial planning and decision-making fits well with demand and supply planning. The current practice of requiring SVS principals to generate local financing for capital expenditures appears, in the well-developed provinces studied, to be working. This "entrepreneurial" approach supports the orientation of these schools towards close linkages with enterprises. It is less likely to be effective, however, for rural SVS with fewer -- and poorer -- sources of capital financing.

Local flexibility in determining quantitative supply and demand targets, however, may not find its reflection in curriculum planning. This remains relatively highly centralized. And even though some flexibility to adapt curricula is reported to exist at local levels, it is not clear where the expertise for such adaptation exists. Hence, the flexibility of the system to adjust to changing qualitative skill requirements merits further consideration; this is particularly important for higher-level technical courses in the STS.

In particular, to the extent that industry develops differentially in different locations, varying technologies and skill requirements will emerge in different places. Centrally determined technical curricula may stand as a barrier to effective collaboration between enterprises and schools in curriculum change to meet local skill requirements. Such collaboration, moreover, would likely need a reasonable level of technical support at the local level from education authorities in curriculum writing and from technical bureaus (and enterprises) in content.

Finally, the relatively greater flexibility of the SVS in enrollment and curriculum planning is important to their apparently successful adaptation to more open labor markets. While this pattern was observed in a limited number of relatively strong schools, it does seem to offer significant potential for meeting the changing needs of a more open economy, especially in the rapidly expanding commercial sectors, and the potentially important area of self-employment.

III. LINKAGES BETWEEN VTE AND LABOR MARKETS IN TWO PROVINCES

China's immediate economic future will consist of a transitional economy characterized by the continued pursuit of the twin (and not necessarily compatible) goals of efficiency and full employment. This may lead to mixed and ambiguous labor market signals. Of particular importance will thus be the evolution of labor market mechanisms which provide a degree of flexibility both within the formal job assignment process, which is very likely to be retained, and beyond it to link training with employment in the expanding service and commercial sectors, including self-employment.

Of equal importance will be the extent to which linkages between employers and schools can lead to improved quality of training and the adaptation of curricula to meet changing skill needs -- and in particular, the need for higher level technicians.

Two kinds of labor markets operate in the provinces studied. The first is that defined by the formal manpower planning and job assignment process. As discussed, this allocation mechanism links the SWS and the STS directly to projected manpower requirements, and results in universal placement. In terms of quantitative match between graduates and employment needs, this mechanism serves reasonably well

to ensure full employment of all graduates. To some extent, too, assignment is made on the basis of performance during training, and this can make an important contribution to the external efficiency of the training system. Thus, the Anshan Iron and Steel Company has, in conjunction with its SWS, established incentives for outstanding students, who not only get a higher salary upon assignment but also are allowed to select the unit within the firm to which they are to be assigned. This policy covered 15 percent of the 1985 graduating class. Interviews further suggest that most graduates are employed in positions requiring the skills acquired in training.

This relatively good fit between the skill requirements of the enterprises and the training of new employees has not occurred as a result of what we would normally cite as the operation of market forces. Firms have had to adjust to the practice of being assigned, not individual workers, but "packets" of workers, some with adequate education and skills, others without. This, combined with exceptionally low labor mobility, has meant that enterprises have been constrained over many decades to rely on skilled labor that they have either trained themselves, or whose training they have directly commissioned. In addition, they have had to raise the general educational level of a large fraction of their workers. Such policies of self-sufficiency in training result in some enterprises being well supplied with skilled labor (no doubt, in some cases, oversupplied), while other firms who have trained neither as vigorously nor as successfully are short of the labor they need. This maladjustment of supply and demand reflects similar maladjustments in the general labor market, where pockets of labor shortage coexist with pockets of labor surplus.

The second market is that which links the SVS through a variety of mechanisms to employers. Here, there are significantly greater elements of a true market in which willing offerers and willing takers of labor services come to mutual agreements on terms of employment. In the provinces studied, these mechanisms also lead to near-universal employment of graduates within the first year after graduation. In Hubei it was reported that only somewhat more than half of the graduates, however, are placed in positions which utilize the skills in which they have been trained.

Figure 5 presents an analysis of the channels that link VTE schools and employers in Liaoning province.

Figure 5: Labor Market Linkages in Liaoning Province

Type of Linkage	Type of School SVS (n=3)	SWS (n=3)	STS (n=3)
Joint ownership and financing	1	1	1
School seeks labor market information	3	0	0
School sells services to employers	2	2	3
Pro-active placement activities	2	na	na
Job assignment	na	3	3
Co-optation of managers	2	na	na
Industry Input to Curricula			
- technical advice	1	2	0
- equipment & other extra-budgetary resources	1	2	0
- provide practice sites	3	3	1
- provide part-time teachers	2	3	0

The data in Figure 5 can serve only as a very approximate indicator of linkages for the nation and even for the province. The sample is very small, and only "good" schools were observed. However, they do provide some insight, if only of the forms of linkage that are possible in the current system -- particularly of relationships that go beyond the formal planning and assignment processes that remain the basis for other linkages.

Joint ownership of a school, such as by the municipal education bureau and the labor and personnel bureau, provides a structure for co-financing and for continuing dialogue on the school and its relationship to employers. The Anshan #1 Vocational School (SVS) illustrates this pattern, with the education bureau financing salaries and capital costs, and the labor bureau the balance of the budget).

The SVS appear to have a decidedly greater latitude than either the STS or the SWS to determine the subjects and the course content of their curricula, though they have by no means complete freedom. For example, the SVS must follow the curricula established at the State level (by the State Education Commission for about 80 percent of the general education material that they teach; the remaining 20 percent is at local discretion). In addition, for some of their vocational-technical courses, they must follow curricula established at the relevant central technical ministry level (for example, in Accounting). But where they do have curricular discretion, the SVS have evolved a rather impressive range of mechanisms to seek labor market information as the basis for determining curricula, as well as enrollment patterns.

These include formal surveys and both formal and informal meetings. For example, in Wuhan, Hubei province, an SVS has run a conference to advertise the school's program to factories and other organizations that might hire its graduates. In some cases, this flow of information is part of a larger and formalized relationship with a given employer. The Shenyang Municipal Vocational Education center has such a relationship with a computer research institute, which serves as an umbrella for a range of exchanges, including placement of graduates and industry input into the curricula in the form of technical advice and equipment. In Shashi, Hubei province, the municipality's Vocational Education Center (an SVS) is run in close cooperation with a select number of enterprises. The enterprises assist with teaching staff, equipment, and money, and it was estimated that about 10 percent of the school's total resources come to it in this way. In return, "graduates will be assigned to enterprises who have supported the school."

Input of this type from industry takes several forms, and is present in both SVS and SWS, the former through school and industry initiative, the latter by virtue of enterprise ownership. Equipment and other resources are donated; in the SWS, these are in addition to regular budgets. The Anshan Iron and Steel Company requires each of 23 affiliated enterprises to donate one piece of equipment to the SWS each year. Enterprises provide practice sites routinely through the SWS curriculum, and for 12-15 week summer assignments for the SVS. The SVS hire part-time teachers from employers, and they are a core feature of the staffing of SWS.

In the STS visited, linkages of this type are rare, with the formal planning and job assignment process being more important. The reasons for this are not totally clear, but may be the result of strong excess demand for STS graduates, which makes it unnecessary for STS to make any particular effort to "sell" their graduates, or to consider changes in their curricula to meet employers' wishes.

Many schools regularly provide training and technical services to employers under contract. These relationships provide important flexibility in meeting training demands, significant income to schools, and a firm basis for school-employer cooperation. Training

is provided both in regular certificate courses (the principal mode for STS) and in both in-service and pre-service.

The SVS have developed active placement services to assist students in gaining employment. Transcripts and samples of student work are routinely provided, and some schools hold the equivalent of "job fairs," in which employers come to the school to meet students and view the results of student work. Better students are given special recommendations which will help them find positions either directly with an enterprise, or through the municipal Labor and Personnel Bureau. These, and the mechanisms discussed earlier, serve to compensate for the absence of job assignment.

Finally, two of the SVS visited in Liaoning had appointed "honorary principals" from employing organizations. These provide technical advice on curricula, participate in school management discussions, and represent the school to external bodies.

What is perhaps most interesting about these linkages is their diversity and the fact that, for the SVS at least, schools employ a broad combination of them.

Even though the data are limited, it is possible to assess the potential of the linkage system to meet the tests of external efficiency and industry input into curricula.

First, for the schools studied in these provinces, virtually all graduates are placed. The SWS and STS are able to match graduates with jobs by virtue of excess demand for workers and the formal planning and job assignment processes. The efficacy of the SVS in matching skills to job immediately upon graduation is apparently significantly lower, but comes close to that of the STS and the SWS within a fairly short period after graduation. In terms of overall external efficiency, the SVS may be even more efficient than the other two types of schools. While the latter rely on assignment, a potentially very inefficient way of allocating labor, the SVS incorporate a much greater element of voluntary assent on the part of both parties to the hiring transaction.

The efficacy of the mechanisms for matching skills to jobs is a product in large measure of the narrow specializations that characterize both employment and training. These are easier to match in assignment schools than in SVS, where students appear often to be trained in more transferable skills (for example, sewing, photography, secretarial skills, and computer operation). Because the STS and, even more, the SWS were established and continue to operate in close touch with particular industries, they have been able to retain their narrowly specialized curricula without fear of reducing the marketability of their graduates. SVS are creations, not of the industrial sector and the technical ministries, but of the Ministry of Education and its successor organization, the State Education Commission, and its provincial and municipal counterparts. Because SVS graduates could not be assured of assignment to employment, the SVS

have been forced to break with the traditional narrow specialization in vocational education, in the hope that the breadth of skills will compensate for graduates' loss of assignment privileges. To date, that hope seems to be broadly justified. However, it is an open question whether SVS can continue to be as successful in job placement in the future as they have been until now, were the excess demand for secondary vocational skills to disappear. Further study of the effect of specialization on transferability of skills and thus on skill match for SVS graduates is warranted.

One result of the "market-driven" nature of SVS is that many of them exhibit a curious assortment of specialties. For example, the Shashi Vocational Education Center already mentioned offered four main specialties: nursery school teacher training; micro-computer operation; electrical mechanic training; and information management. When queried about this rather disparate mix, the reply pointed to three sources of "demand": the school responds to requests for skill training transmitted to it by the Labor and Personnel Bureau; it tries to fill gaps in provision left by other more specialized schools; and it has a special relationship with local factories, which will take all of its output of electricians.

Both the SVS and SWS appear to have well-established mechanisms for employer participation in the curricula. Taken together with the relatively higher degree of curriculum flexibility open to the SVS, these mechanisms offer particular potential for continuing adjustment of curricula to evolving skill needs. Nevertheless, the lesser extent of curriculum flexibility in the SWS may inhibit to some degree the ability of these schools to adjust quickly to the needs of their owning enterprises.

The apparent lack of mechanisms at the school level for employer participation in curriculum definition in the STS is of particular concern given the pressing need to expand technician training and incorporate new technology.

A new phenomenon is the rapid growth of short-term proprietary training courses run by social agencies and individuals to meet urgent local needs for specific skills. Although these "schools" must register with the local authorities and meet certain minimum standards, there is as yet no comprehensive information available on their number, or specialties. Unlike training provided by Labor Service Companies, these courses remain outside the State plan and are not yet quantitatively important. However, they provide an added link between the labor market and training arrangements, and they are likely to become more important in the future.

IV. SOME COMPARATIVE PERSPECTIVES

In her current drive toward modernization, China is following many paths already trodden by other nations, and in a few ways, China is breaking newer ground. The following section attempts to draw parallels and contrasts as applicable, between China and five major industrialized nations (the Soviet Union, Britain, France, Japan, and the Federal Republic of Germany), with special reference to those matters most closely associated with the planning of VTE, and alternative approaches to major policy issues in VTE that may be of use to China. Three topics are dealt with: increasing the vocational content of secondary schooling; locating VTE close to the workplace; and using manpower forecasting as a basis for decisions about the supply of VTE places.

Increasing the Vocational Content of Secondary Schooling

The relationship between investment in education and training and subsequent economic growth is exceptionally complex. Just as in the aggregate, the simple creation of physical capital is not sufficient to ensure economic growth, so the mere fact of investment in human capital formation (including education and training) is also no guarantee of economic progress. As with physical capital investment, costs must be held in proper relation to likely returns, the type and location of the investment must be carefully chosen, the timing must be right, and policies for allocation and utilization are as important as programs of actual capital formation.

It is tempting to believe that economic growth will be most aided by education that teaches skills to be applied directly in subsequent productive work. Moreover, the official ideology of many nations calls for a break with inherited cultures that have denigrated physical labor as being unworthy of a cultivated citizen. This last motivation is particularly strong in socialist countries, among them China with its long tradition of Confucian philosophy and Mandarin practice.

However, organizing education along narrowly vocational lines is probably a mistake in all but the most exceptional circumstances. Vocational education and technical training clearly have their place, but they need to follow after, not substitute for, a good general education in language, mathematics, science, history, geography, and civic education. Even in what used to be relatively simple trades and crafts, technological change has entered so fast and so deeply that the unlettered, uneducated worker is at a grave disadvantage and over his/her lifetime is likely to fall far behind the norm in terms of productivity and earning capacity.

The practical question for educational policy is to establish how much general, basic education is to be given, before the vocational element begins to dominate. In earlier times, six years or so of primary schooling was thought to be enough. The past 40 years since the end of World War II has seen an extension of this period in most

industrialized countries to about 9 years. China has set a goal of 9 years (6 years of primary, and 3 years of junior secondary). In comparative perspective, this seems about right, as long as the quality of education in those 9 years is good. Moreover, China's current aim of achieving a 50:50 balance of enrollments in secondary general and secondary vocational and technical education by 1990 is broadly in line with trends to enhance the vocationally-relevant content of secondary education in many major educational systems.

In Western Europe, two major considerations have pushed erstwhile academically-oriented secondary school system in the direction of vocational content: very sharp increases in youth unemployment that have reinforced the view that the traditional curriculum did not help many young people to find a job; and a slow down in economic growth that, it was felt, could be overcome only by improving the job-preparation of young people, especially in new technologies, computing, interpersonal and communication skills, and the like. Also, in the Soviet Union, the new leadership under Mr. Gorbachev has endeavored to incorporate substantial vocational and work experience elements in a secondary school curriculum that has remained academic to an extraordinary degree. Partly, this renewed effort has ideological roots: Marxist and Leninist educational philosophy stresses the unity of intellectual and physical work, and the desirability of weaving them into a unified "polytechnical" education. But partly the renewed effort is a response to similar problems in Western Europe: lagging technological progress, coupled with a marked deterioration in rates of economic growth.

Britain provides perhaps the most pointed example of all in Europe, where lagging economic performance, a sense of technological stagnation, and levels of youth unemployment are all at their most worrisome. Perhaps, as a consequence, the last four to six years in England and Wales have witnessed the beginning of wrenching changes in traditional ways of managing the secondary schools and their curricula, with the aim of incorporating into a traditional academic curriculum typically taught didactically, far greater elements of vocational studies, taught in a more vocationally-relevant manner.

The Department of Employment through a new organization (the Manpower Services Commission) has made available over 200 million pounds to support its so-called Technical and Vocational Education Initiative (TVEI). Beginning in 1982, the 104 local education authorities in England and Wales were invited to submit proposals for a TVEI grant (averaging approximately 2 million) to support courses of direct vocational relevance <u>within existing secondary schools</u>. By 1986, most LEA's had submitted proposals and had had them accepted. TVEI programs are designed to occupy the four years from 14-18 years of age, though many of them have had difficulty in retaining students after age 16, the end of compulsory schooling in Britain. The first two years are given over about three-quarters to regular academic subjects, and one-quarter to TVEI "options." The vocational proportion will become much larger in the final two years (but at this date, few students have come this far). "Options" include: horticulture/

agriculture; photography and film; textiles; printing; business studies; catering and food technology; computing and word processing; building construction; electrical engineering; electronics; jewelry -- though different proposals incorporate different vocational areas.

Apart from the skewing of the curriculum toward job-related skills of a direct kind, TVEI represents a direct intrusion of a central government department (the Department of Labour) into curriculum approval and funding, a function that has traditionally been reserved to local authorities. Moreover, TVEI sets the scene for potential jurisdictional disputes between the Department of Education and Science (DES) and the Department of Employment, to the extent that DES is by law the central government's regulatory body for the schools of England and Wales (Scotland has different arrangements). Channels of coordination between the two central government departments are not easily arranged, and there is a good deal of strain evident, especially as the Manpower Services Commission has been funded generously just when DES (and local authority) funds for the schools have had to endure severe budgetary constraints.

The parallels between China's move to establish Secondary Vocational Schools (SVS) and the TVEI program in England and Wales are striking. A heretofore strong emphasis on academic, general education is to be weakened by a large admixture of vocationally-relevant studies; the new programs are to be (mostly in China; and wholly in Britain) inserted within existing schools; specialties ("options") are to be chosen in accordance with local labor market needs; every effort is to be made to attract, if not the most academically gifted children, at least students with good academic skills and competence; the central government is prepared to find extra funds to pay for equipment and other start-up costs of the new programs; and it is expected in both countries that programs will be designed and run in consultation with local employers and their representatives. In addition, China, like Britain, must find ways of coordinating the work of different authorities in the hands of the State Education Commission (SEdC) and its local and provincial counterparts. Britain has not yet come so far, but may do so as the jurisdictional and morale problems arising from the existence within a single school of a well-funded Department of Employment TVEI program alongside a relatively impoverished Department of Education and Science general education program become severe.

Perhaps, most important of all, both programs are driven by the hope that they will help to overcome competitive disadvantages vis-a-vis technologically more advanced nations, who have prepared their labor forces more adequately to adapt to new technology and produce goods of higher, and more saleable, quality.

Location of VTE

One of the longstanding discussions in VTE policy is over the location of training: is it best done in schools, or in the workplace? Perhaps this oversimplifies the question, as the following 2 x 3 table in Figure 6 indicates:

Figure 6: Location of VTE

	INSTITUTION	
LOCATION	School	Firm
Classroom		
Workplace		
Training Shop		

VTE can take place in a classroom, in the workplace, or in a special shop dedicated to training, either when a student is enrolled in a school, or when he/she is attached to a firm as a worker or apprentice.

In the past, training exclusively within the workplace as an apprentice was the dominant mode in many countries. The trend in the last few decades, virtually worldwide, has been to abandon apprenticeships in favor of pre-service, in-school training. Practical training takes place in purpose-built training workshops attached to a school, and there is some opportunity for workplace practice under supervision. China has followed this pattern. Current policy is to de-emphasize apprenticeship as a mode of preparation for work in industry or commerce, if not virtually to abandon it.

The arguments against apprenticeship are well-known. It is criticized as: fostering too early, and often too narrow, specialization; encouraging exploitation of the cheap labor of young people; providing an impoverished curriculum from the viewpoint of the theory underlying practice; and fostering the creation of a class of workers condemned to occupy a lower status in the firm and in a society at large. In its favor is the exceptionally important element of closeness to the actual practice of work in the firm, and to the skilled workers whose intimate knowledge of industrial or commercial practice cannot easily be conveyed outside of the work setting. At its best, apprenticeship tends to the inculcation of values promoting high quality work and a professionalism that is the hallmark of the master craftsman.

However, good apprenticeship training is not easy to arrange; the norm across the world has been rather poor, exploitative experiences for apprentices. If only to avoid this, nations have turned away from apprenticeship, although school based training is also not without its problems -- and critics. It is frequently accused of transferring outmoded skills, irrelevant knowledge, unmarketable

credentials, and ignorance of the values, attitudes, and motivation that a young entrant must cultivate for a successful career in the workplace as a member of a productive team.

Two nations, the Federal Republic of Germany and Japan, have recognized the great value of locating industrial and commercial training in, or in closest association with, the firm. Not coincidentally, these are two nations whose industrial products and commercial performance are at a high level. However, they have institutionalized firm-based training quite differently. Germany has chosen the apprenticeship route ("training before employment"), while Japan has abandoned it in favor of intensive and systematic training of newly hired, intensively educated, young people, who are provided with job rotation and career development ("education before employment-and-training").

Instead of abandoning apprenticeship in favor of school based VTE, Germany (together with neighboring Austria and Switzerland) has chosen the route of upgrading, systematizing, and regulating apprenticeships. The German approach involves both the firm and the school system: it attaches the trainee to the firm as an apprentice in a very formal manner for two to three years, and it enrolls the trainee compulsorily in an occupational training school on release time (hence the term, "dual system"). Germany's highly developed system has not been instantly achieved. On the contrary, the origins of contemporary achievements in Germany can be traced back to 1925 when an employer's organization (German Committee for Technical Schools--DATSCH) issued regulations for apprenticeship training, and to 1930 when examinations for commercial and industrial apprentices were introduced. After 1935, there was a rapid increase in the number of training workshops in firms. There are now over 5,000 training workshops within and associated with firms. The "dual system" dates from innovations made during the period 1953-65 by the German Committee for Education and Training. In 1969, the Law for Vocational Training codified the dual system on a nationwide basis, identifying the Federal Government as the arbiter of in-firm training and the provincial (Land) governments as the regulators and providers of the school-based components.

From the 1950s to the present, there have been many criticisms levelled against the "dual system." In the late 1970s, these criticisms reached a crescendo, especially from those who objected to apprenticeship in any form, as being a class-based and class-perpetuating institution. Trade Union and Federal Government spokesmen (the Social Democratic Party was in power at the time) feared the dual system would break down because firms would no longer offer enough training places in a period of economic downturn. By 1986, it is clear that the dual system has weathered the storm of criticism, and is now attracting significant numbers of graduates from the academic high schools (Gymnasien Abiturienten) who at the age of 19 after a rigorous 8-year course of study at the secondary level see their best opportunities for a job and a career not via entry to a general or technical university, but in a shortened 2-year apprenticeship under the dual system.

Germany has shown that apprenticeship can be made into a very attractive vehicle for initial industrial and commercial training. Although, the German approach cannot be simply copied in China, there are elements of the dual system that would fit well with China's existing institutions. China has a long and voluminous experience with enterprise-based and enterprise-sponsored training; workers' organizations (trade unions) are conditioned to cooperation with management: enterprises are used to responding to government requests to adapt their training modes to changed models; wages rates are under government control and could be adjusted to make it attractive for skilled workers to spend part of their time with apprentices; it should not be difficult to arrange release-time so that apprentices could continue their general education and theoretical training in schools provided by local authorities under Education Commission jurisdiction; and, as the Wuhan experience has already demonstrated, there is a substantial possibility that technical assistance in setting up and administering a form of dual system in China would be available from the FRG.

However, the German model relies on very careful, nationwide regulation of the terms of apprenticeship, the content of vocational training, and the standards for final assessment of trainees' performance. China is apparently taking some steps in this direction. If they could be carried forward in a deliberate, long-term manner, they could provide the framework for a most useful complement to the school-based training that Chinese policy is presently emphasizing.

As we have noted, Japan provides an alternative, quite different, model for bringing training very close to the workplace, and if the German model does not appeal to Chinese policymakers and administrators, the Japanese approach merits consideration. (A recent study of this approach will be found in Inoue, 1985.)

The essential characteristics of Japanese practice have been: emphasis on a strong general education in primary and secondary school, on the ground that "in a time of rapid technological progress a deep and wide range of general knowledge is more useful than specific vocational skills, which may soon become obsolete" (Inoue, 1985: 29); selection for employment on the basis of achievement in general education; and highly systematic and well-supported training and personnel management within the firm.

Japan runs two parallel secondary school systems, one (the largest, with nearly 5 million enrolled in 1984) provided under the jurisdiction of the Ministry of Education; the other (with roughly 300,000 enrolled) provided by the Ministry of Labor. The MOE schools are mostly (though as we shall see, not exclusively) general education schools, taking in both lower and upper secondary school leavers for education and training.

MOE lower secondary schools provide a three-year program after the standard six-year primary school. The curriculum is virtually exclusively academic. Only in upper secondary schools

(attended by 94 percent of the age cohort) is there some relaxation of the emphasis on general education. While 70 percent of the upper secondary enrollment is in general (academic) schools, the 30 percent remaining are distributed among commercial schools (12 percent), engineering schools (10 percent), agriculture (3 percent), home economics (3 percent), and fishery, nursing, and others (each less than 1 percent). Even so, less than one third of secondary school leavers report that their subsequent occupation is related to their secondary school subjects. According to Inoue, all of this "implies that vocational courses at upper secondary schools do not play a significant role in producing skilled manpower, and that general course leavers are trained in a company."

Ministry of Labor vocational training schools are established by local, government authorities (prefectures or municipalities). Courses vary in length from six months to two or three years, and are quite specialized. These schools enroll only about one-sixteenth of the number of young people enrolled in the Ministry of Education Schools, so their place in the overall secondary education scene is relatively minor.

Just as China has a number of important preconditions that could facilitate a move in the direction of Germany's dual system, so it could equally well consider moving in the Japanese direction, without doing violence to its traditions. As in Japan, China has for long emphasized the value of general education, and selection for further education, training, and work on the bases of competitive examination results. Like Japan, China is likely to retain lifetime attachment of workers to a particular employer for a sizeable fraction of its labor force, even if lifetime attachment as a near-universal practice is moderated over the next 5 to 10 years. What would be needed are the kinds of incentives that Japan provides to encourage firms to undertake training -- primarily, financial assistance for in-plant vocational training open to employees and non-employees, and loans to help trainees undertake training; and adaptation to Chinese conditions of Japanese firms' systematic and intensive programs of recurrent basic worker training, combined with rotation of workers through different jobs in the firm, and careful selection (on the basis of worker performance) for access to the special training in the firm that leads to promotion to higher and more responsible positions (see Inoue, 1985: 30-56, and Orr and Orr, 1985: 28-37). As we have pointed out, too, China's wage system as currently organized does not provide either managers or workers with appropriate incentives and signals. Movement toward the Japanese practice of providing a very large fraction of total remuneration in the form of bonuses would be helpful, though whether this change could be successful in Chinese conditions is a matter of some dispute.

Manpower Forecasting and VTE Planning

A fundamental premise of past and current planning for VTE in China is that there exists a relatively tight coupling between the skilled labor "needs" of industry, commerce, and government and the output of graduates from the VTE system. Another way of phrasing this

premise is to assert that, given a specific technology of production, there exists one best skill- and qualifications- structure of the labor force to serve that technology.

However, neither economic theory nor the experience of other industrialized nations supports this premise. Rather, economic theory points to possibilities for the substitution of differently trained types of labor in identical work positions, given sufficient flexibility of relative wage rates; and different nations have used fundamentally different skill assortments to staff their industrial operations, even with roughly similar technologies and in enterprises of broadly similar size.

Thus, a study of patterns of skill- and credential- mixes in West German and French industry, reported in Lutz (1981: 73-86) showed that across matched pairs of firms in the two nations, quite different education, training, and qualification mixes have been associated with apparently efficient adaptations in terms of employment. Thus, German industry has worked well with its abundance of skilled workers produced by a dual system of apprenticeship training in firms and continued general education on release time in schools, alongside a dearth of general education and higher education. On the other hand, France has had a dearth of graduates from long-term level apprenticeship training, but an abundance of graduates from general education, short-term, in-school vocational training, and higher education. Each country has adapted its skill and qualifications requirements accordingly. In Germany, industry tends to employ far fewer foremen and other supervisory personnel per worker than in France: "... the production division of a German machine tool factory employs 450 workers, but only 20 supervisors and managers at three management levels. The comparable company in France, which builds an identical machine, requires 40 supervisors and managers at eight management levels to control and supervise some 400 workers." (Lutz, 1981: 75).

The lesson is that there is no "one best" mix of skilled and general education labor. Historical precedents and cultural norms have shaped the educational and training systems of different nations quite differently. As long as relative wage rates are permitted to adjust to relative scarcities, there is no reason to suppose that different assortments of skill and education levels cannot produce perfectly satisfactory economic results.

It may very well be that the stock of skilled labor in China is at present far smaller than any conceivable configuration of labor and capital could justify. As we were told repeatedly, there are many years of neglect and even deliberate dismantling of the VTE system to remedy. In any event, great hope may be drawn from the existence of multiple avenues for training, in enterprises and in schools of many types, in Labor Service Companies, and in even less formal arrangements. However, even if the supply side is rendered satisfactory, unless existing relative wage rigidities are substantially relaxed, China's economic progress could be seriously hindered. Enterprise managers will continue to have little, if any,

incentive to conserve scarce and expensively prepared skilled labor, and they will continue to send along to the labor forecasting and planning offices of their local and provincial governments statements of "need" based on some idealized and empirically unjustified notion of the "proper" ratio of this kind of labor to that kind of technology.

In this respect, it is worth noting that socialist societies have typically been very successful in increasing the stock of workers with skill training, engineering degrees, and technical qualifications. The Soviet Union has succeeded in raising its output of engineers, for example, far above that of the United States, and its network of institutions at the senior secondary level for vocational education and technical training has graduated millions of students with mid-range skills and knowledge (see Blumenthal and Benson, 1979).

However, none of this has stilled the constant clamor of managers in the Soviet Union for more skilled workers. Problems arising from the misallocation of the available stock of skilled workers and engineers are publicly acknowledged, but the remedy of a more flexible set of wage rate relativities, that more closely reflects relative scarcities, continues to elude Soviet planners and managers alike. China can learn from the Soviet example that it is not enough to be successful on the supply side of the VTE equation; appropriate signals and incentives on the demand side are vital, too.

One recognizes that many societies with egalitarian preferences find it difficult to institute and maintain skill-based wage differentials of sufficient size to provide the clear signals needed. While this has obviously been a problem of socialist societies, it is important to recognize that it has not been a problem confined to such societies, but is also to be observed in a number of non-socialist societies with strong egalitarian preferences and/or powerful industrial (as distinct from craft) trade unions. Britain, Australia, and Sweden are examples of such societies, and all have found it difficult to maintain appropriate stocks of skills. Young people are reluctant to offer themselves for training, if their eventual skills will be undervalued by being relatively underpaid, and the demand for such skills is over-extended because it is seen by managers as being relatively cheap, if a supply can be obtained.

China will not be alone in finding it difficult to overcome egalitarian preferences. Wages are not solely a device for allocating labor; wages must also serve other important (and often conflicting) functions in society. But it can be argued that the degree of wage rate and earnings compression in China is quite excessive, and a viable relationship between the VTE system and the labor market can hardly be created and sustained without some basic reform of the wages and earning structure.

V. SUMMARY AND CONCLUSIONS

The conclusions that follow draw primarily on the observations and data for two relatively well developed provinces, Liaoning and Hubei. They reflect what may be possible as Chinese VTE is developed, and should not be taken as necessarily representative of contemporary China as a whole.

1. The labor force in China is very weak in skilled personnel at all levels, and especially so for higher level technicians. Yet China is committed to an ambitious program of industrial and commercial expansion. There is therefore a very strong demand for skilled personnel at all levels, despite deficiencies which may exist in the completeness, relevance, or up-to-dateness of skills.

2. Demand for skilled labor is stimulated, too, by underpricing skilled labor. Wage differentials for higher level skills are relatively small, and an important check on managers' tendency to use skilled labor to excess is therefore absent. On the supply side, levels of training capacity are low, both quantitatively and qualitatively for a country with China's degree of industrialization. The result is a severe and persisting imbalance between the demand for and the supply of skilled labor.

3. A further result of the imbalance in the labor market for skills is that there is virtually universal placement of the graduates of pre-service vocational training and education (VTE) institutions. Graduates of Skilled Worker Schools (SWS) run by various enterprise and government units under the broad control of the Ministry of Labor and Personnel are guaranteed employment after graduation through job assignment. The same is true for Secondary Technical Schools (STS), overseen since 1986 by the State Education Commission but having traditionally strong links to the technical ministries and enterprises. Automatic job assignment is not available to the graduates of the Secondary Vocationals (SVS), also run under the general aegis of the State Education Commission. However the SVS studied have evolved in a very few years varied and extensive institutional linkages with employers, with the result that more than 95 percent of the graduates are placed within the first year after graduation. There is evidence that a substantial number of VTE graduates, especially SVS graduates, do not find work in the speciality for which they have been trained, but work "outside their training." This should not be automatically regarded as evidence of the external inefficiency of the VTE system. It may be a sign that the VTE institutions are managing to equip some graduates with sufficient transferable skills to enable them to secure employment in more than a single, specialized line of work. More research on skills transferability in the Chinese context would be welcome.

4. The near certainty of securing a job (either via assignment or via training institution linkages to the labor market and the graduates' own search efforts) raises the demand for pre-service VTE places far beyond the present and prospective (until 1990) capacity of the VTE institutions to satisfy. As a consequence, all VTE institutions are able to select applicants for admission by competitive examination. Secondary Vocational Schools are able to set relatively high admission cut-off points in the common entrance examinations for secondary schools, though still not as high as the levels set by "key" general education schools.

5. The present policy of pushing toward a 50:50 general-to-vocational enrollment mix by 1990 means that general senior secondary places will increase only slowly (from 7.6 million in 1986 to 8.1 million in 1990), while vocational school places in Secondary Vocational Schools and Secondary Technical Schools will grow rapidly (from 4.4 million to 7.79 million). As the numbers graduating from junior secondary education will still be rising strongly, the academic level of students admitted to VTE is likely to be well maintained.

6. There is as yet no evidence that the introduction of contract (as against tenured) hiring of labor has reduced employers' willingness to offer and finance training. All respondents, whether employers, trainers, government officials, or research personnel, were unanimous in believing that the economic reforms (including the introduction of contract hiring) would probably increase, and certainly not decrease, enterprises' training effort. Three principal reasons for this counter-intuitive outcome were offered: increased competition among firms will stimulate attention to higher quality output, in turn requiring higher levels of skills; technological progress and diffusion will also mandate higher skill levels, and hence more training; and, last, the structure of the Chinese economy will change, with more weight in those sectors that require higher skill levels. Thus even if the current practice of life-time attachment of workers to a given employer weakens, the economic reforms will, it is claimed, produce other very strong effects which will overwhelm the prediction from partial equilibrium theory that employers will do less training.

7. There is as yet no evidence that the policy of "training before employment" has been in operation long enough to affect the need for in-service training of workers. In-service training has fallen short in quantity and quality in the past for two major reasons: political events, such as the Cultural Revolution; and low levels of funding which have restricted the training capability of firms. As the economic reforms progress, incentives to enterprises to offer training (in order to raise labor productivity and become competitive) may increase, and firms may be able to use enhanced managerial authority to increase the quantity and quality of training.

8. The formal planning system seeks to balance manpower supply and demand, and is complex, with many levels and units. While manpower forecasting and planning exercises can have some value as general indicative guides, they are of little use (and can be thoroughly

damaging) for economic development if a government enforces them in a mechanistic and rigid manner. Indeed, the incentive structures and modes of government control are changing so fundamentally in contemporary China that the authorities' ability accurately to forecast future skill needs, and to use the results as the basis for reliable planning of VTE must be seriously doubted. In general, the climate of economic reform poses a particular challenge for VTE planning and development, mandating the need for a system able to adapt in fundamental ways to changes in economic management.

9. There are some solid grounds for optimism in this respect. Planning for manpower match and even for some aspects of the financing of the VTE system in China is already quite decentralized, incremental, and based on a good deal of formal and informal consultation and consensus building. In the current circumstances, therefore, China's present mode of "bottom-up" manpower forecasting, with only the most general guidelines from Beijing as to how many and what types of skilled workers to train, is to be welcomed as being likely to contribute to successful economic outcomes. The process, while structurally appropriate, could be improved through better information at all levels. Data on employment outcomes would be especially useful in policy and planning decisions.

10. In addition, the curricula of the SVS have been able to provide skills relevant to the service sector and to self-employment. These schools are scheduled for large increases in enrollment. In combination with evolving linkages with employers and considerable school initiative in finding work for graduates, SVS have the potential for providing large-scale, flexible, and relatively low cost forms of skills training to support the government's goal of expanding service sector and self-employment.

11. The present report has focused on the external efficiency of the VTE system in China. However, the internal efficiency of the system (that is, the effectiveness with which available resources are utilized) suffers from a number of weaknesses:

(a) training units are often too small;

(b) curricula are very narrowly specialized;

(c) course lengths are unusually long for the material covered.

It is beyond the scope of the present report to suggest ways in which the internal efficiency of the VTE system might be improved, although such improvements will have important implications for external efficiency.

12. China is not alone among the major countries of the industrialized world in seeking to improve the VTE system. Knowledge of the past and present experiences of those other countries is likely to be useful to Chinese VTE personnel, even though foreign models and

practices can rarely be adopted wholesale, but must be adapted carefully to the particular conditions of the "borrowing' country.

Comparative analysis tends to support the following conclusions:

(a) China has placed secondary level VTE in closer association with employers and the workplace than have most industrialized countries. In this sense, VTE in China is potentially quite advantaged. Indeed, many advanced industrialized nations (for example, Britain, France, and the United States) are currently trying to find ways to involve employers more closely with secondary education (see Noah and Eckstein, 1986). Everything should be done to preserve and strengthen China's already strong and close connection between employers and training, for it is one of the best assurances that training will be externally efficient. Moreover, reliance on enterprises to carry the costs of training can provide welcome incentives to operate training programs more efficiently than government-run school-based training. China no doubt has a long way to go in realizing this potential, but as economic reforms take hold in China, and enterprise managers are empowered to retain larger shares of their profits, internal efficiency of the VTE programs within enterprises may be expected to improve.

(b) However, relative to its level of industrialization, and compared to the historical experience of other countries when they were at China's current level of development, China appears to have made a less than adequate VTE effort. "The formal age-based system of vocational/technical education in China has not developed steadily since the 1950's and remains underdeveloped compared to that of other developing economies" (Orr and Orr, 1985, p.1). "Achieving the four modernizations will require a good stock of skilled manpower in Chinese manufacturing industries and other enterprises such as transportation, construction and mining. The existing stock is low..." (World Bank, 1983a, p. 138).

Chinese party and government statements about recommended policy changes continue to stress the past neglect of investment in human resources, in particular neglect of VTE (see "Li Peng Addresses Vocational Education Forum", Xinhua text, reported in China: PRC National Affairs, July 10, 1986). But it will be important to translate into practice the announced targets for higher VTE funding levels, for otherwise it is unlikely that the full potential of China's close linkages between VTE and the employers can be realized.

(c) China's current policies in VTE call for continuing to shift away from apprentice-type VTE toward in-school VTE. In this respect, also, China is following a path already taken by many other nations. The outstanding exceptions to this otherwise general movement are Germany, Austria, and Switzerland. In these three nations, apprenticeships are based on a tradition of close cooperation between the employers, trade unions, and educationals authorities; a highly formalized set of regulations, spelling out the details of the

apprenticeship contract, the nature of the experiences to be offered and the skills to be learned; and the maintenance of very substantial wage differentials between apprentice and skilled worker. Clearly Germany, Austria, and Switzerland have profited greatly from their apprenticeship arrangements: standards of craftsmanship are very high, and the management and organization of production tend to be in the hands of those who know intimately the problems and potentials of the technologies of their industry. China could profit from a careful examination of such apprenticeship arrangements, with a view to adapting to Chinese conditions important elements of the German system.

(d) On the other hand, China might find elements to emulate in the Japanese approach, which may be summarized as being neither "training before employment", nor "training after employment", but rather as "education before employment-and-training". A movement along these lines would require China to pay substantially more attention to in-service VTE than is presently the case. However, the present policy of "training before employment" would appear to lead in the direction of greater emphasis on pre-service training. Although VTE in China has the potential to move in the Japanese direction, this would require deep changes in the way the work force is organized, changes in managers' attitudes to skills acquisition and the deployment of workers in production, as well as very substantial changes within Chinese industry with respect to job-rotation, career-long training, and systems of remuneration. Whether such deep changes are a practical possibility is an open question.

(e) China's current aim of achieving a 50:50 balance of enrollments in secondary general and secondary vocational and technical education by 1990 is also broadly in line with trends to enhance the vocationally-relevant content of secondary education in many major educational systems around the world. Indeed, there are some striking parallels between China's initiatives with respect to the expansion of the network of Secondary Vocational Schools and, for example, Britain's Technical and Vocational Education Initiative (TVEI). In addition, in most of the countries of continental Western Europe, employers are demanding that the secondary school curriculum be made more relevant to the world of work and production (Noah and Eckstein, 1986). There is always a cautionary note to be sounded here: VTE at the secondary level should not be used a substitute for a solid general education for most young people. However, China will in all likelihood avoid this danger, at least in so far as the curriculum of the SVS are concerned, for these schools devote a very large fraction of total school time to general education subjects.

(f) China continues to rely on manpower needs forecasting in planning VTE capacity. In recent years, this forecasting has become more "indicative" and less "imperative"; at the same time it has become more decentralized and incremental, more aggregated and less finely detailed. Comparative and historical experience of the developing nations has shown up the weaknesses of trying to base educational planning on anything other than the most generalized forecasts of skill needs. At the same time, comparison of labor- and skill-mixes in the

developed industrialized nations have shown that there are often many different perfectly acceptable mixes of skilled and unskilled labor that can be adopted, given reasonable flexibility of wage rates and wage differentials. In particular, socialist countries probably need to guard more than capitalist ones against the danger of concentrating too much attention on the production of large numbers of skilled personnel, and too little attention on the efficient allocation in production of this expensively produced labor. Using manpower needs forecasting as the basis for educational planning encourages falling into this error, which becomes ever more serious as a nation moves to a more complex structure of economic life. Hence, China's current practice of decentralized, incremental and aggregated manpower forecasting and planning seems appropriate. Planning can, perhaps, be strengthened on the enterprise side by strengthening the capacity of management to plan for efficient labor allocation in the production process.

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